Study & Master

Mathematical Literacy

CAPS

Teacher's Guide

Grade 12

Karen Morrison • Karen Press

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CAMBRIDGE UNIVERSITY PRESS

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SECTION 1

INTRODUCTION

Study & Master Mathematical Literacy Grade 12 is based on the Curriculum and Assessment Policy Statement (CAPS) issued by the Department of Basic Education in December 2011. The CAPS is an amended version of the National Curriculum Statement Grades R–12, and replaces the 2002 National Curriculum Statement Grades R–9 and the 2004 National Curriculum Statement Grades 10–12.

The general aims of the South African curriculum as stated in the CAPS:

a. The Curriculum and Assessment Policy Statement gives expression to what are regarded to be knowledge, skills and values worth learning. It will ensure that learners acquire and apply knowledge and skills in ways that are meaningful to their lives. In this regard, the curriculum promotes the idea of grounding knowledge in local contexts, while being sensitive to global imperatives.

b. The Curriculum and Assessment Policy Statement serves the purposes of:
- equipping learners, irrespective of their socio-economic background, gender, physical ability or intellectual ability, with the knowledge, skills and values necessary for self-fulfilment, and meaningful participation in society as citizens of a free country
- providing access to higher education
- facilitating the transition of learners from education institutions to the workplace
- providing employers with a sufficient profile of a learner's competences.

c. The Curriculum and Assessment Policy Statement is based on the following principles:
- social transformation: ensuring that the educational imbalances of the past are redressed, and that equal educational opportunities are provided for all sections of our population
- active and critical learning: encouraging an active and critical approach to learning, rather than rote and uncritical learning of given truths
- high knowledge and high skills: the minimum standards of knowledge and skills to be achieved at each grade are specified and they set high, achievable standards in all subjects
- progression: the content and context of each grade show progression from simple to complex
- human rights, inclusivity, environmental and social justice: the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa are included.

d. The Curriculum and Assessment Policy Statement (General) is sensitive to issues of diversity such as poverty, inequality, race, gender, language, age, disability and other factors:
- valuing indigenous knowledge systems: acknowledging the rich history and heritage of this country as important contributors to nurturing the values contained in the constitution

- credibility, quality and efficiency: providing an education that is comparable in quality, breadth and depth to those of other countries.

e. The Curriculum and Assessment Policy Statement aims to produce learners who are able to:
- identify and solve problems and make decisions using critical and creative thinking
- work effectively as individuals and with others as members of a team
- organise and manage themselves and their activities responsibly and effectively
- collect, analyse, organise and critically evaluate information
- communicate effectively using visual, symbolic and/or language skills in various modes
- use science and technology effectively and critically showing responsibility towards the environment and the health of others
- demonstrate an understanding of the world as a set of related systems by recognising that problem-solving contexts do not exist in isolation.

f. Inclusivity should become a central part of the organisation, planning and teaching at each school. This can only happen if all teachers have a sound understanding of how to recognise and address barriers to learning, and how to plan for diversity.

Time allocation: Grades 10–12

The instructional time allocation in Grades 10–12 is set out in the table below.

Subject	Time allocation per week (hours)
I. Home Language	4,5
II. First Additional Language	4,5
III. Mathematics and Mathematical Literacy	4,5
IV. Life Orientation	2
V. Three electives	12 (3 × 4 h)

The CAPS states that 'the allocated time per week may be utilised only for the minimum required NCS subjects as specified above, and may not be used for any additional subjects added to the list of minimum subjects. Should a learner wish to offer additional subjects, additional time must be allocated for the offering of these subjects.'

What is Mathematical Literacy?

Mathematical literacy can be defined as 'an individual's capacity to use mathematics as a fully functioning member of a society' (Ball and Stacey, University of Melbourne).

The CAPS document identifies the following five key elements of the subject Mathematical Literacy:
- the use of elementary mathematical content
- real-life contexts
- solving familiar and unfamiliar problems
- decision-making and communication
- the use of integrated content and/or skills in solving problems.

In other words, the subject Mathematical Literacy aims to produce learners who have:

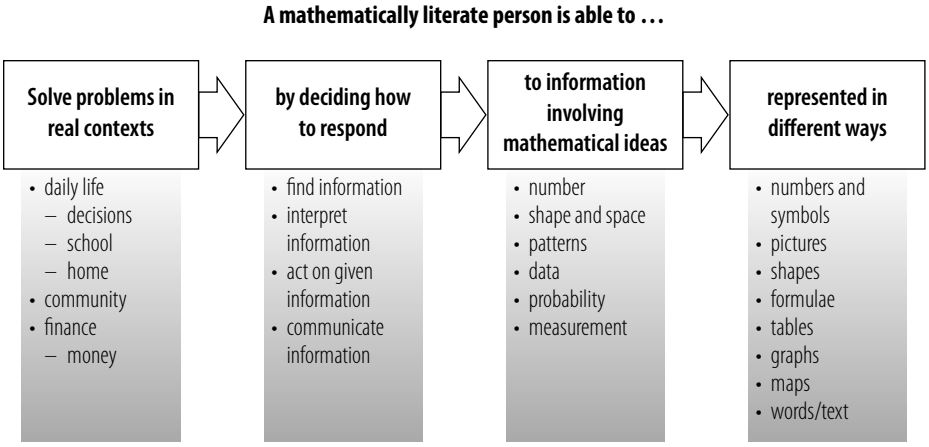
- a sense of self-worth and who are able to control aspects of their life related to mathematical understanding
- the skills and understanding to play a responsible role in our society
- the ability to calculate, estimate and use measuring instruments
- developed strategies and decision-making skills that allow them to be innovative and flexible in their approach to solving problems
- the ability to communicate results and explanations and the skills to work effectively and collaboratively with others
- the ability to draw sensible conclusions from information presented graphically and apply skills in data-handling and interpretation.

What does it mean to be mathematically literate?

Mathematical literacy is more than the ability to do basic arithmetic. It also includes:

- working confidently and competently with numbers, measures and diagrams in a range of real and realistic contexts
- choosing and applying a range of techniques and skills, including the use of technology (calculators and computers)
- understanding how numbers and measurements are collected, organised and displayed in tables, graphs and other forms
- developing and using decision-making and problem-solving strategies that suit both the problem and the context
- communicating results and solutions in appropriate ways.

The flow diagram below breaks down the steps that a mathematically numerate person will follow and details what is involved in each step.



Mathematics and Mathematical Literacy are not the same

Mathematics is an abstract subject that is often theoretical and that requires specific language, skills and methods to deal with subject-specific problems.

Mathematical Literacy takes mathematical knowledge and skills and applies them to everyday situations and problems. Mathematical Literacy is contextual and useful. When learners take processes and ideas from mathematics and apply them in contexts that are specific to their lives (such as choosing a cellphone contract), they are mathematically literate. The following table shows differences between Mathematics and Mathematical Literacy. It also shows how the content and context are interconnected when you are developing mathematical literacy.

Mathematical Literacy	Mathematics
Task and context	*Content*
Doubling a recipe	Equivalent fractions Multiplying and adding fractions
Reading instruments such as a thermometer, rain gauge or barometer	Measurement and units Understanding a scale
Deciding which cellphone contract is the most affordable	Equations in two variables that represent a relationship Solving simultaneous equations (graphically or algebraically)
Administering medicine	Reading a table of values to find amounts that correspond to given conditions (such as the age or mass of a patient) Ratio and calculation
Mixing plaster (for building)	Ratio and proportion Measuring amount in units for volume and mass
Mixing solutions (fertilisers or pesticides)	Calculating area and using ratio and proportion to mix necessary amounts
Planning a trip	Time–distance–speed relationships Using ratio and proportion or algebra Budgeting for petrol, meals, accommodation and other expenses Calculating with time (non-decimal amounts)

Financial literacy

Financial literacy is a large part of mathematical literacy and it has become increasingly important in modern life. Our society needs citizens who are able to understand the value of money and manage money in appropriate and responsible ways. When learners leave school and enter the world of work, they will have to engage actively with complex and specialised financial services just to manage their own money affairs. In addition, they will need to be aware of consumer issues and make plans for their longer-term financial wellbeing.

In recent times there have been many changes in our society including:

- technological developments (autobanking, internet banking, chip and pin card services)
- increased competition in financial markets (more banks want your money)
- a rise in questionable financial practices, including unethical loans, unfair interest rates and hire purchase (HP) terms that include large balloon payments
- changes in personal finances, including rising household debts
- changes in demographics (more poorer households that may not use formal banking systems, more young people having to make financial decisions without the guidance of older family members)
- increased consumer responsibility as younger people have access to banking services and debit and credit cards, which in turn leads to increased chance of being a victim of fraud.

These and other changes that are likely to occur in the future make it even more important that we produce learners who are financially literate.

Our approach to teaching Mathematical Literacy

Our approach is that learners develop understanding by making connections between what they are learning and their lives.

Here is a summary of the steps in this process and how they are developed in the course:

Step 1: Learning basic skills (for example, how to carry out operations with fractions).

Step 2: Practising what you have learnt (for example, naming fractions of a whole, adding simple fractions)

Step 3: Using and applying learning in everyday contexts (for example, dividing an amount of money into different fractions, drawing pie graphs using fractions)

Step 4: Understanding the larger social and cultural uses of specific mathematics (for example, discussing the ways in which different societies have used fractions and how Egyptian fractions differ from those used today)

Step 5: Critically engaging with what you have learnt (for example, examining how fractions and percentages can be used in the media to mislead consumers)

This course offers a carefully planned and contextualised approach to the subject that allows teachers to:

- help learners see how mathematics can be valuable and useful in their lives, develop confidence and a sense of personal achievement and encourage ongoing interest and a willingness to find creative solutions to problems
- develop skills, concepts, understandings and attitudes that help learners handle the mathematical contexts they have to manage in their lives
- ensure the learners develop and employ a range of problem-solving methods and grow their ability to think and reason logically and sensibly
- make sure learners have the levels of mathematical literacy they need to be able to cope in an increasingly technology-reliant and information-rich society
- equip learners with the tools and skills they will need and use as they enter the world of work
- give learners the skills and confidence to use their own language and ways of expressing mathematical ideas and also grow their ability to make sense of mathematical ideas presented to them in various formats and ways.

Interpreting and communicating answers and calculations

Study & Master Mathematical Literacy offers a complete course that provides learners with the tools and opportunities to:

- construct their own knowledge and understanding rather than passively listening to the teacher (transmitted or received knowledge) by solving real-life problems, using real documents and investigating real issues, on their own, with a partner and in groups
- integrate and connect their learning, including connecting topics, content, procedures and ideas, as well as actively promoting connections to their life experiences and ideas by applying skills in different contexts, integrating what they have learnt in one context with what they are doing in others
- solve authentic, real-life (rather than contrived) problems, which are matched to the content of the course by using real documents, published case studies and statistics from the real world
- develop mathematical thinking, including communication and the representation of answers and ideas, and moving towards more abstract and creative thinking by working in different ways, finding their own methods of recording their thinking, and using their own language

together with the language and notation of mathematics where appropriate to make their communication as clear and simple as possible.

The CAPS topic, interpreting and communicating answers and calculations, is built into the course and applies across both the basic skills and application topics. As they work through the material, learners will be expected to:

- make sense of their own strategies and solutions
- share their observations and solutions and understand other learners' observations and solutions.

Making sense of their own strategies and solutions

The habit of estimate–solve–check is developed and reinforced throughout the course. Learners are expected to estimate before they try to find solutions and check their solutions against their estimates to make sure they are sensible and correct. Strategies for doing this are presented in examples, and are reinforced as learners work through the application topics in all four terms.

In addition, learners are expected to give explanations, justify and explain their methods and communicate their findings and answers to others, both formally and informally as they work through the course.

Sharing observations and solutions and understanding others' observations and solutions

Through taking part in pair, group and class discussions, learners will find that the ways in which they have communicated their workings and solutions are not always clear to others. Discussions with others, and seeing and discussing modelled solutions in their books (and in this teacher's guide) will help them see that better use of mathematical conventions and symbols, as well as more systematic presentation of results, will improve their communication of ideas and reduce ambiguity and confusion. This will help them to better understand solutions and ideas presented to them by others.

In addition, *Study & Master Mathematical Literacy* aims to point out very clearly to learners that there are several ways to approach mathematical problems and encourage them to be creative when they are doing and using mathematics in everyday contexts.

Your role as the teacher

Teaching Mathematical Literacy effectively means focusing on process skills in context rather than on straight mathematical content. This means that your classroom practice will revolve around:

- problem-solving, reasoning and decision-making
- communicating and representing ideas
- identifying relevance and making connections.

Teaching Mathematical Literacy effectively means that you cannot just use the textbook and ask learners to memorise facts, learn rules for doing things and then write formal tests. Effective teachers of Mathematical Literacy need to approach the subject from a real-life contextual angle, where the mathematics is derived from actual situations or realistic models and learners can work through activities, investigations and problems in their own ways.

Making sure all learners are included

Many learners fail to reach their potential because they do not see how mathematical ideas are relevant to their lives and because they are not encouraged to connect what they are learning about mathematics to their existing experiences, skills and knowledge. This is a particular problem for learners who see the contexts in the textbook as irrelevant or inappropriate in their own situations.

In Mathematical Literacy, context is the driver for learning. When real-life situations are used, the learning becomes relevant and the educational value of the experience is increased. However, contexts are unique and you may find that some of the contexts offered in the course are not relevant or appropriate for some of the learners. In these cases, you may need to adapt the given activities to better suit your own situation.

The CAPS document details what the learners need to learn and suggests contexts for teaching. However, you can adapt this to meet specific needs by asking yourself what the learners already do or are interested in. Once you have established this, you can work out what to teach them by asking what the learner has to know to be able to do the thing they are interested in.

This Grade 12 course builds on the mathematical literacy skills and concepts learners have acquired in Grades 10 and 11. They should by now have a strong grasp of the basic methods used to do activities in each content area of Mathematical Literacy – finance, measurement, maps, plans and other representations of the physical world, and data handling. In Grade 12 learners will develop their mathematical literacy further by doing **more complex practical activities involving problem-solving, assignments and investigations**, using the methods and tools they already know – see the Resources section that starts on page 193. A summary of the main calculation methods needed for these activities is also given in the Reference section at the back of the Learner's Book.

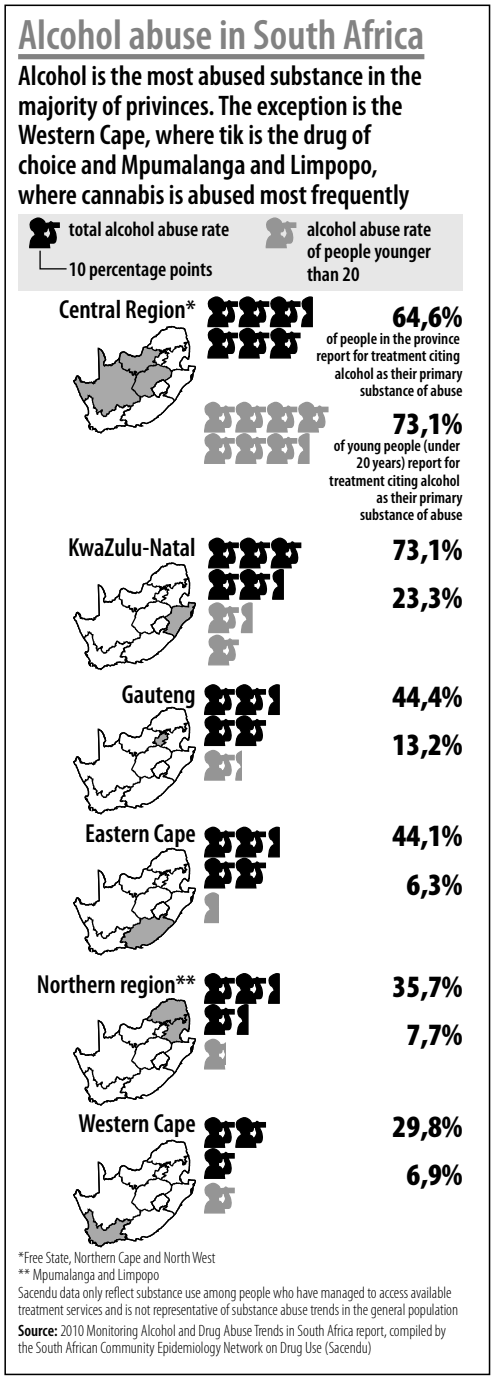
The focus on workplace and small business situations exposes learners to planning, problem-solving and financial monitoring insights and skills they need to develop to deal with real-life experiences such as:

- reading quotations from businesses
- budgeting before giving quotations to customers
- preparing invoices and receipts
- calculating cost price and setting selling price
- budgeting for projected expenditure
- budgeting for inflation
- reading payslips
- travel allowance claims
- understanding UIF.

Finding information and resources

An important aspect of mathematical literacy is **knowing how to find the information needed** to solve a problem or carry out a project – for example, doing an internet search and collecting information from local businesses or government offices. In Grades 10 and 11 the information learners needed to do activities was generally provided as part of the activities. In Grade 12 some of the activities will require learners to do this research, and to choose information for solving the problem that is most suitable to their context.

In all cases where this is so, you should adapt tasks to suit the available local sources of information, expert advice, and so on. For example, many activities in the measurement section ask learners to consult a local builder or building supply store for information about schedules, materials and costs involved in building a house. You may want to identify some specific local builders or stores that will be willing to respond to learners' queries.



Another essential mathematical literacy skill is being able to make sense of newspaper articles, TV news reports and other **everyday sources of information about our world**, when these items include numerical information. In this course learners will spend some time reading and interpreting news and feature articles that present this kind of information to develop their ability to use numerical information, graphs and other data in their daily lives. You can augment these activities with articles from local newspapers (for example, a report on the 2011 National Census or articles about the performance of learners on national assessment tests), and other documents that provide interesting information about the South African and international context.

You can help learners to apply their mathematical literacy skills to a broad range of contexts simply by bringing newspaper articles on diverse topics to class for discussion and analysis. Learners need to be able to apply the skills they are developing in the classroom to a general understanding of the social, economic and political information that surrounds them in everyday life. They can gain the confidence to do this by paying detailed attention to examples of daily news reports that include graphs, statistics and financial information. For example, the group of maps on the left that appeared in a Sunday newspaper in early 2012 contains information that learners could find interesting, but that they might not bother to read because it is presented in 'mathematical' language. Ask learners to find their own examples of such items in newspapers, on the internet and from other sources, and spend class time exploring and discussing the information they contain.

You will find other suggestions for alternative contexts in this Teacher's Guide and in the CAPS document.

Overcoming maths anxiety

Many learners who opted for Mathematical Literacy in Grade 10 will have experienced some form of maths anxiety. They may believe they are not capable of doing maths or that it is too difficult for them. Or, they may have experienced failure in mathematics classes and this might make them feel anxious about anything to do with maths. Or they may just have internalised attitudes and perceptions about mathematics that make it difficult for them to see how they will ever be able to succeed at anything mathematical – these

include perceptions such as ‘girls can’t do maths’ and ‘my father was no good at maths and neither am I’.

One of your roles as a teacher of Mathematical Literacy is likely to be helping to reduce the levels of anxiety that learners feel and encouraging them to see that they already carry out tasks quite easily in everyday life that require them to apply mathematical thinking. Using context rather content is one of the first steps to helping learners consider and talk about the informal mathematics they use without really thinking about it, and this in turn can empower them and boost their confidence and motivation.

There are things that you can say and behaviour that you can encourage to help learners to overcome anxiety about mathematics:

- Don’t give up immediately if you don’t understand something.
- It does not matter if you get the wrong answer.
- You can work slowly – we are not in a race.
- If you get stuck on one part, move on and come back to it later.
- Ask another learner for help.
- Don’t immediately think you are wrong.
- Ask for another explanation if you don’t understand at first.
- Work in a group to solve the problem.
- Make sure you can explain how and why you got the answer.
- Listen to the questions that other learners ask because it might be about something you don’t understand either.
- Make sure you understand the concept you are working on before you move on.
- Refer to the basic skills section at the back of the Learner’s Book when you forget how to do something.

Using resources to enhance learning

Calculators

The calculator is an important learning tool that learners can use to develop, explore and consolidate new ideas. Calculators are very useful when you want learners to investigate and discover number facts and patterns and make generalisations. Using a calculator allows the learners to focus on finding ways of solving a problem rather than on routine mechanical operations that can detract from the real point of a problem, particularly in learners who are not good at mathematics and who lack confidence in their own abilities.

Learners should have access to a simple calculator and be encouraged to use it for all the activities in this course.

Measuring equipment

There is no doubt that using real tools and apparatus can help learners develop and clarify their understandings of mathematics, particularly in the areas of measurement. Using tools and measuring instruments allows the learners to develop abstract ideas and form concepts from practical experience. This is just as important in Grade 12 as in lower grades.

Navigating the textbook

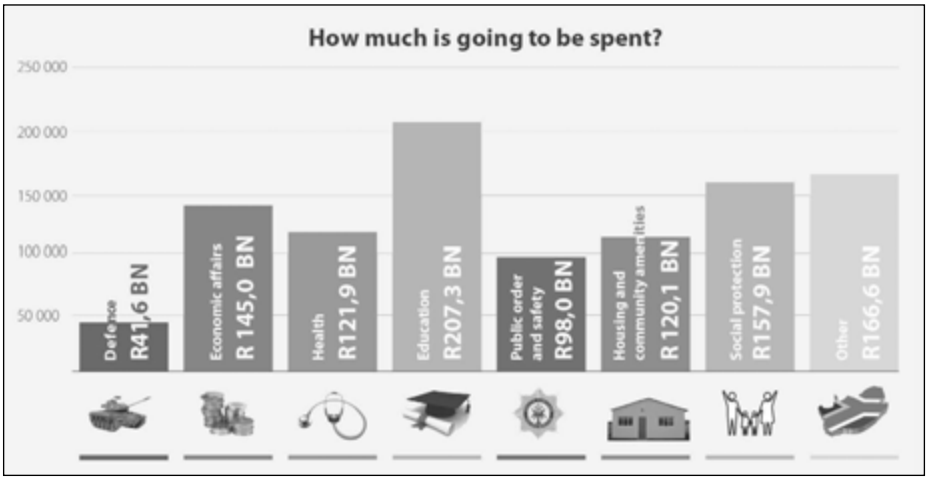
We have organised the content of the course to follow the sequence of topic sections set out in the CAPS Suggested work schedule for Grade 12. The learners work term by term through sections of the applications topics as sequenced in the suggested work schedule. In Term 4 they will plan a revision programme and work through example exam papers to prepare for the final exams.

To help learners who are not sure about the calculation methods, formulae and other mathematical methods that were covered in Grade 10 and 11, this material is included in the Learner's Book in the skills reference section. Learners are directed to relevant parts of this section, where they will find explanations and examples of techniques they need to use in a specific problem-solving context.

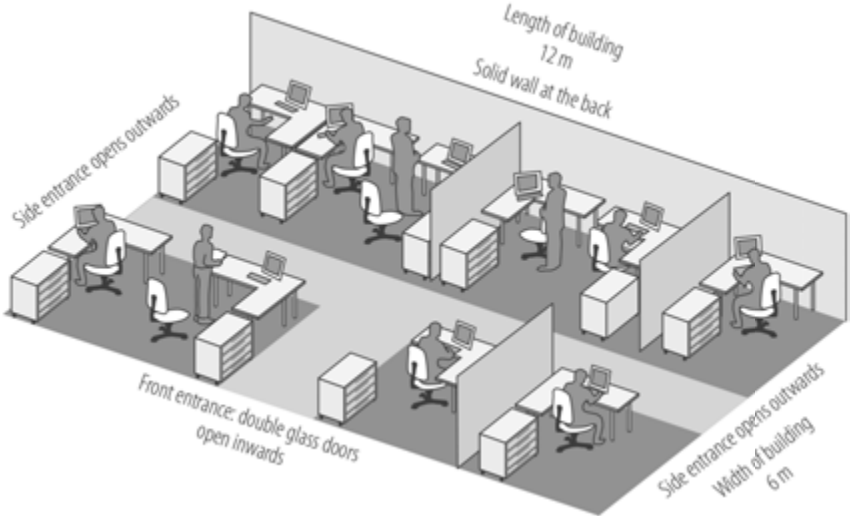
The application topics use real-life South African as well as international examples as far as possible to provide appealing and interesting contexts that will interest and engage Grade 12 learners. Information is presented in many different forms, so that learners become familiar with the many ways in which content that they need to understand can be structured. You should supplement the examples in the Learner's Book with as many locally relevant examples as possible (such as accounts from local shops and your local municipality and maps of the region, city or neighbourhood where you live).

Examples of information in different forms in the Learner's Book:

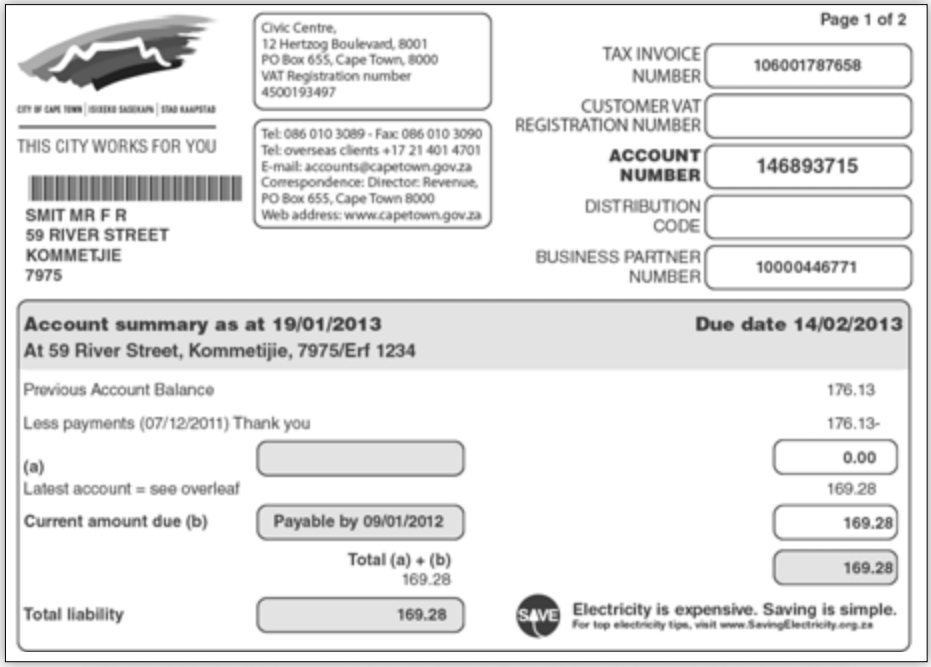
Information in graphs and charts



Information on diagrams



Information on documents



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Page 1 of 2

TAX INVOICE NUMBER 106001787658
CUSTOMER VAT REGISTRATION NUMBER
ACCOUNT NUMBER 146893715
DISTRIBUTION CODE
BUSINESS PARTNER NUMBER 10000446771

Account summary as at 19/01/2013 — **Due date 14/02/2013**
At 59 River Street, Kommetjie, 7975/Erf 1234

Previous Account Balance		176.13
Less payments (07/12/2011) Thank you		176.13-
(a) Latest account = see overleaf		0.00
		169.28
Current amount due (b)	Payable by 09/01/2012	169.28
	Total (a) + (b) 169.28	169.28
Total liability	169.28	

SAVE Electricity is expensive. Saving is simple.
For top electricity tips, visit www.SavingElectricity.org.za

Account Details as at 17/05/2011 A/C No 146893715 Page 2 of 2

>>>>> 91555146893715

PROPERTY RATES (Period 21/12/2010 to 19/01/2011) 30 Days	R C	R C
AT 59 RIVER STREET, KOMMETJIE, 7975 / ERF 4489		
# Total Value		
From 21/12/2010: R1 475 500.00 @ 0.0053000 ÷ 365 x 30	642.75	
# Statutory Rebate CR		
From 21/12/2010: R15 000.00 @ 0.0053000 ÷ 365 x 30	6.53 -	
# Additional Rebate CR		
From 21/12/2010: R185 000.00 @ 0.0053000 ÷ 365 x 30	80.59 -	
		555.53
WATER (Period 14/12/2010 to 17/01/2011 - 35 Days (Actual Reading)		
AT 59 RIVER ST, KOMMETJIE / ERF 4489		
Meter No: ZUK788 / Consumption 37.000 kl / Daily Average 1.957 kl		
* Consumption charge (Dom)		
(1) 6.9040 l; Free (2) 5.1780 kl @ R3.9900		
(3) 10.9320 kl @ R8.5100 (4) 13.9860 kl @ R12.6100	290.05	
		290.05
REFUSE (Period 21/12/2010 to 19/01/2011) 30 Days		
AT 59 RIVER ST, KOMMETJIE / ERF 4489		
* Disposal Charge (1 x 240 l BIN x 1 Removals)	75.44	
		75.44
SEWERAGE (Period 14/12/2010 to 17/01/2011 - 35 Days (Actual Reading)		
AT 59 RIVER ST, KOMMETJIE / ERF 4489		
* Disposal Charge		
(1) 4.833 kl Free (2) 3.6250 kl @ R4.6700		
(3) 76520 kl @ R9.9400 (4) 9.7900 kl @ R10.8700	199.41	
		199.41
Add 14% VAT on Amounts marked with * above		79.09
0% VAT on Amounts marked with # above		

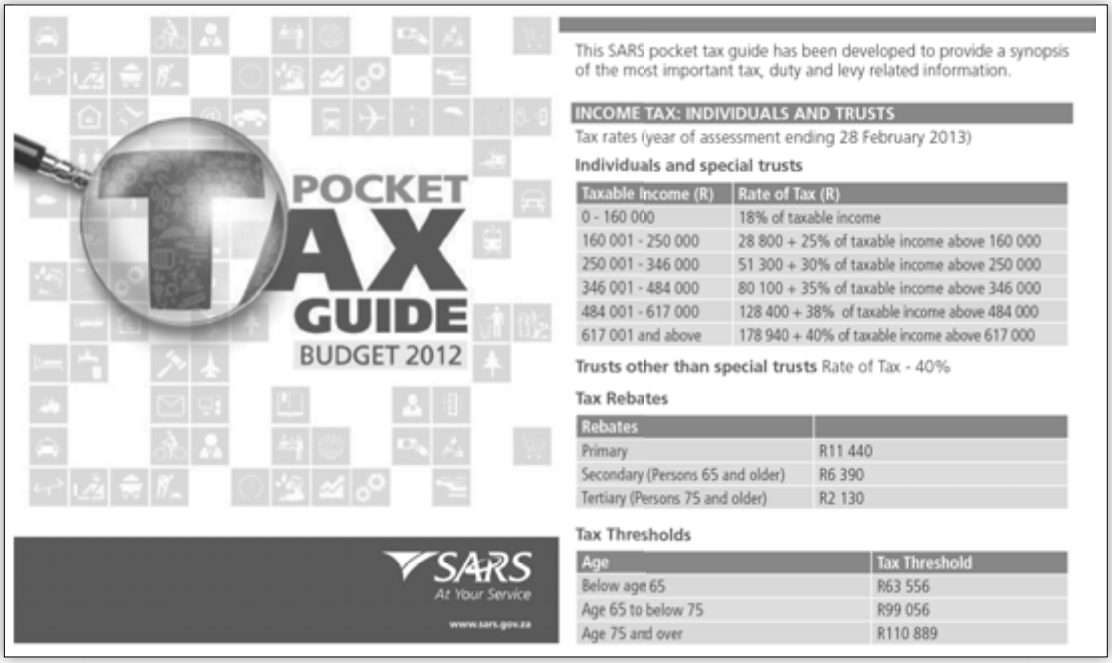
LATEST ACCOUNT TOTAL DUE R 1 199.62

METER DETAILS/PROPERTY VALUES		OLD READINGS	NEW READINGS	UNITS USED
WATER	ZUK788/001	3515.000 kl (Actual)	3552.000 kl (Actual)	37.000 kl

Information in tariff tables

TOLL ROAD TARIFFS							
N4: Pretoria – Lobatse (Botswana border)			**Operator**	**Class I**	**Class II**	**Class III**	**Class IV**
Quagga	Main line	Magalies eastern section	Intertoll	R3,00	R5,50	R8,00	R11,00
Pelindaba	Main line	Magalies western section	Intertoll	R4,00	R7,50	R11,00	R14,00
Doornpoort	Main line	Pretoria – Brits	Bakwena	R10,00	R25,00	R29,00	R35,00
K99 Interchange	Ramp	Local destinations	Bakwena	R10,00	R25,00	R29,00	R35,00
Brits	Main line	Brits - Mooinooi	Bakwena	R10,00	R35,00	R39,00	R46,00
Buffelspoort	Ramp	Local destinations	Bakwena	R10,00	R24,50	R27,00	R32,00
Marikana	Main line	Mooinooi – Rustenburg	Bakwena	R15,00	R36,00	R41,00	R49,00
Kroondal	Ramp	Local destinations	Bakwena	R10,00	R24,50	R27,00	R32,00
Swartruggens	Main line	Rustenburg – Zeerust	Bakwena	R71,00	R177,00	R215,00	R253,00

Information in text form



POCKET TAX GUIDE BUDGET 2012

SARS At Your Service
www.sars.gov.za

This SARS pocket tax guide has been developed to provide a synopsis of the most important tax, duty and levy related information.

INCOME TAX: INDIVIDUALS AND TRUSTS

Tax rates (year of assessment ending 28 February 2013)

Individuals and special trusts

Taxable Income (R)	Rate of Tax (R)
0 - 160 000	18% of taxable income
160 001 - 250 000	28 800 + 25% of taxable income above 160 000
250 001 - 346 000	51 300 + 30% of taxable income above 250 000
346 001 - 484 000	80 100 + 35% of taxable income above 346 000
484 001 - 617 000	128 400 + 38% of taxable income above 484 000
617 001 and above	178 940 + 40% of taxable income above 617 000

Trusts other than special trusts Rate of Tax - 40%

Tax Rebates

Rebates	
Primary	R11 440
Secondary (Persons 65 and older)	R6 390
Tertiary (Persons 75 and older)	R2 130

Tax Thresholds

Age	Tax Threshold
Below age 65	R63 556
Age 65 to below 75	R99 056
Age 75 and over	R110 889

Provisional Tax

A provisional taxpayer is any person who earns income other than remuneration or an allowance or advance payable by the person's principal. The following individuals are exempt from the payment of provisional tax–

- Individuals below the age of 65 who do not carry on a business and whose taxable income –
  - will not exceed the tax threshold for the tax year; or
  - from interest, dividends and rental will be R20 000 or less for the tax year.
- Individuals age 65 and older if their taxable income for the tax year–
  - consists exclusively of remuneration, interest, dividends or rent from the letting of fixed property; and
  - is R120 000 or less.

A provisional tax return showing an estimation of total taxable income for the year of assessment is only to be submitted if the Commissioner for SARS so requires.

Retirement fund lump sum withdrawal benefits

Taxable Income (R)	Rate of Tax (R)
0 – 22 500	0% of taxable income
22 501 - 600 000	18% of taxable income above 22 500
600 001 - 900 000	103 950 + 27% of taxable income above 600 000
900 001 and above	184 950 + 36% of taxable income above 900 000

Retirement fund lump sum withdrawal benefits consist of lump sums from a pension, pension preservation, provident, provident preservation or retirement annuity fund on withdrawal (including assignment in terms of a divorce order).

Tax on a specific retirement fund lump sum withdrawal benefit (X) is equal to –

- tax determined by applying the tax table to the aggregate of that lump sum X plus all other retirement fund lump sum withdrawal benefits accruing from March 2009, all retirement fund lump sum benefits accruing from October 2007 and all severance benefits accruing from March 2011; less
- tax determined by applying the tax table to the aggregate of all retirement fund lump sum withdrawal benefits accruing before lump sum X from March 2009, all retirement fund lump sum benefits accruing from October 2007 and all severance benefits accruing from March 2011.

Retirement fund lump sum benefits or severance benefits

Taxable Income (R)	Rate of Tax (R)
0 – 315 000	0% of taxable income
315 001 - 630 000	18% of taxable income above 315 000
630 001 – 945 000	56 700 + 27% of taxable income above 630 000
945 001 and above	141 750 + 36% of taxable income above 945 000

Retirement fund lump sum benefits consist of lump sums from a pension, pension preservation, provident, provident preservation or retirement annuity fund on death, retirement or termination of employment due to redundancy or termination of employer's trade.

Severance benefits consist of lump sums from or by arrangement with an employer due to relinquishment, termination, loss, repudiation, cancellation or variation of a person's office or employment.

Tax on a specific retirement fund lump sum benefit or a severance benefit (Y) is equal to –

- tax determined by applying the tax table to the aggregate of that lump sum or severance benefit Y plus all other retirement fund lump sum benefits accruing from October 2007 and all retirement fund lump sum withdrawal benefits accruing from March 2009 and all other severance benefits accruing from March 2011; less
- tax determined by applying the tax table to the aggregate of all retirement fund lump sum benefits accruing before lump sum Y from October 2007 and all retirement fund lump sum withdrawal benefits accruing from March 2009 and all severance benefits accruing before severance benefit Y from March 2011.

Cross-referencing

As learners work through the course, they are directed to other places in the book by link boxes in the shoulder. These links tell the learners where to find the maths skill they need to apply to solve a problem. These boxes link to the basic skills reference section and to places in the application topics where a particular skill was taught or used.

Use real distances to calculate measurements on a plan

How to work out equivalent ratios is covered on page 513 in the Learner's Book.

Use the steps below to make a scale drawing or map.

Step 1: Find or measure the real lengths

Step 2: Decide how big your drawing will be as this will help you work out a scale

SECTION 2

PLANNING

Suggested work schedule

Below is a work schedule that outlines estimated time allocations per topic as well as a particular sequence of teaching. This work schedule follows exactly the recommendations given in the CAPS document.

Term 1			
Week	**CAPS topic**	**Unit**	**LB pages**
1	Measurement (conversions; time)	Unit 1 Measuring units and conversions Unit 2 Measuring time Measurement revise and consolidation	2–6 8–30 31–33
2	Finance (financial documents; tariff systems; Income, expenditure, profit/loss, income-and-expenditure statements and budgets; cost price and selling price; break-even analysis)	Unit 3 Financial documents at home and at work Unit 4 Tariffs	34–65 66–88
3	Finance (financial documents; tariff systems; income, expenditure, profit/loss, income-and-expenditure statements and budgets; cost price and selling price; break-even analysis)	Unit 4 Tariffs Unit 5 Income-and-expenditure statement and budgets	66–88 89–111
4	Finance (financial documents; tariff systems; income, expenditure, profit/loss, income-and-expenditure statements and budgets; cost price and selling price; break-even analysis)	Unit 5 Income-and-expenditure statement and budgets Unit 6 Cost price, selling price and break-even analysis Finance revise and consolidation	89–111 112–122 124–130
5	Data handling	Unit 7 Data handling	131–172
6	Data handling	Unit 7 Data handling	131–172
7	Data handling	Unit 7 Data handling	131–172
8	Data handling	Unit 7 Data handling	131–172
9	Data handling	Unit 7 Data handling Data handling revise and consolidation	131–172 174–176
Assessment Assignment and investigation Control test (covering measurement, finance, and data handling, integrated with numbers and patterns concepts)			

Term 2			
Week	**CAPS topic**	**Unit**	**Pages**
1	Finance (interest; banking; inflation)	Unit 1 Interest and interest rates Unit 2 Banking, loans and investments	178–203 204–230
2	Finance (interest; banking; inflation)	Unit 2 Banking, loans and investments Unit 3 Inflation	204–230 231–244
3	Maps, plans and other representations of the physical world (scale and map work)	Unit 4 Scale Unit 5 Maps	251–258 259–278
4	Maps, plans and other representations of the physical world (scale and map work)	Unit 5 Maps	259–278
5	Measurement (measuring length, measuring weight, measuring volume, measuring temperature; calculating perimeter, area and volume)	Unit 6 Measuring length and distance Unit 7 Measuring mass	283–300 301–319
6	Measurement (measuring length, measuring weight, measuring volume, measuring temperature; calculating perimeter, area and volume)	Unit 7 Measuring mass Unit 8 Measuring volume	301–319 320–333
7	Measurement (measuring length, measuring weight, measuring volume, measuring temperature; calculating perimeter, area and volume)	Unit 9 Measuring temperature Unit 10 Calculating perimeter, area and volume	334–339 340–366
8	Measurement (measuring length, measuring weight, measuring volume, measuring temperature; calculating perimeter, area and volume)	Unit 10 Calculating perimeter, area and volume	340–366
9	Revise and consolidate	Finance Mapwork Measurement	246–250 280–282 369–372
Assessment Assignment/investigation Mid-year examinations (2 papers; 2 hours each; 100 marks each) (Finance, maps and measurement, integrated with numbers and patterns concepts)			

Term 3			
Week	**CAPS topic**	**Unit**	**Pages**
1	Finance (taxation; exchange rates)	Unit 1 Taxation	374–399
2	Finance (taxation; exchange rates)	Unit 1 Taxation	374–399
3	Finance (taxation; exchange rates)	Unit 2 Exchange rates	400–409
4	Maps, plans and other representations of the physical world (scale and plans)	Unit 3 Scale and plans	418–427
5	Probability	Unit 4 Probability	430–445
6	Probability	Unit 4 Probability	430–445
7	Maps, plans and other representations of the physical world (models)	Unit 5 Using models to investigate shape and space	448–451
8	Maps, plans and other representations of the physical world (models)	Unit 5 Using models to investigate shape and space	448–451
9	Revise and consolidate	Finance Maps and plans Probability Maps and plans – using models	411–417 428–429 446–447 452–454
Assessment Control test (covering data handling and/or probability, integrated with numbers and patterns concepts) Trial examinations (2 papers; 3 hours each; 150 marks each) (covering all topics in the curriculum)			

Term 4			
Week	**CAPS topic**	**Unit**	**Pages**
All	Revision	Unit 1 Structuring your revision programme Unit 2: Preparing for the final Mathematical Literacy examination papers Unit 3: Examination-style questions and examination papers	456–495
Assessment End-of-year examinations (2 papers; 3 hours each; 150 marks each) (covering all topics in the curriculum)			

Programme of assessment

The programme of assessment (POA) for Grade 12 Mathematical Literacy should consist of eight formal assessment tasks that are assessed internally. Seven of these tasks are undertaken and assessed during the school year, and they comprise 25% of the total mark for Mathematical Literacy. The eighth task is the end-of-year examination, which comprises 75% of the total mark.

The programme of assessment must include assignments, investigations and control tests, and these should be planned so that all topics and sections of the Grade 12 course are addressed throughout the year. A possible programme of assessment for Grade 12 is given below with the suggested weighting of each item. Remember though that internal formal assessment (including at least one examination) accounts for only 25% of the overall mark for Mathematical Literacy, the end of year external examinations account for the other 25%.

Program of assessment

Term 1: One assignment (10%) AND one investigation (10%) AND one control test (10%)

Term 2: One assignment OR one investigation (10%) AND one internal examination at the end of the term (25%)

Term 3: One control test AND one examination OR end of term control test (25%)

If a school choses to have only one examination at the end of Term 2 or Term 3, the other one must be replaced by an end of term control test that counts for 25% of the internal formal assessment marks.

Activities that can be used by teachers for control tests, assignments and investigations have been included in both the Learner's Book and this Teacher's Guide.

Control tests

In control tests, learners are given all the information required to complete a task. These tests are carried out under examination conditions. They will help prepare learners for their final examination. The Learner's Book includes activities that require learners to apply a method that was taught in a unit to a new set of information. These activities can be used as part of a control test or repeated for the test with new information supplied by the teacher.

You will find advice for setting control test and examination questions on pages 25 and 26 of this Teacher's Guide.

Assignments and investigations

In Grade 12 learners are expected to complete one assignment and one investigation (in Term 1) plus an additional assignment or investigation as part of their seven required formal assessment tasks for the year. This Teacher's Guide provides a wide variety of assignments and investigations from which you can choose to fulfil this requirement.

Assignments are structured tasks that give learners clear guidelines about how to carry out a task, and where there is a well-defined solution to the task. The content and context of an assignment should be based on work already covered in the course, and it should allow learners to apply a method or approach that they have already learnt to use. There are activities throughout the Learner's Book that can be used as assignments for assessment purposes

and also activities in the Resources section in this Teacher's Guide (these activities may be photocopied and they may be used as replacements for Learner's Book activities). They are indicated in the table on pages 22 to 24.

Investigations

Investigations are tasks in which learners go through a series of steps that involve guided discovery to achieve an understanding of a concept and/or a method, and apply their mathematical literacy skills in new situations. An important aspect of this type of task is that learners should use insight and understanding of the context to make an appropriate decision based on their investigative work. There are extended investigative activities throughout the Learner's Book and also in the Resources section in this Teacher's Guide that can be used for assessment purposes. They are indicated in the table on pages 22 to 24.

Note that an assignment or an investigation may cover more than one topic or section, and it can be used to assess concepts and methods that have been learnt in both/all these sections. For example, an investigation that involves comparing the costs of different cellphone options can be used to assess learners' understanding and skills relating to patterns, relationships and representations (working with two or more relationships) and finance (tariff systems).

Suggested assignments and investigations in the Learner's Book

Term 1

Topic	Section	Assessment type and name	Page reference
Measurement	Conversions	1.3 Assignment: Convert and calculate measurements Measurement: Investigation 1: Create a body-based conversion table	LB 6 TG 195
		Measurement: Investigation 2: Research the meaning and use of measuring units	TG 195
	Time	Measurement: Investigation 3: Crop production schedules in your region	TG 196
		2.7 Investigation: Plan and budget for a holiday trip	LB 29
Finance	Financial documents	3.5 Assignment: Finding information in the Tax Pocket Guide	LB 64
		Finance: Investigation 1: Design a filing/record-keeping system for your own household financial documents	TG 196
	Tariff systems	4.3 Investigation: Tariffs in your municipality	LB 62
		Finance: Assignment 1: Organise tariff information into an easy-to-use format	TG 197
		Finance: Investigation 2: Compile a transport tariff guide for your area	TG 198
	Income-and-expenditure statements and budgets	5.2 Investigation: Compile an income-and-expenditure statement for a mealie vendor's business	LB 93
		5.3 Assignment: Compile a personal income-and-expenditure statement and budget	LB 93
		Finance: Investigation 3: Compile a personal budget for the year after you complete Grade 12	TG 198
		Finance: Investigation 4: Budget for a dream holiday	TG 199
		5.5 Investigation: Analyse an income-and-expenditure statement for a community organisation	LB 70
		Finance: Investigation 5: Analyse your local municipality's budget	TG 200
	Cost price, selling price and break-even analysis	6.2 Investigation part 1: Calculating costs of production and total cost price	LB 115
		6.4 Investigation part 2: Budget to achieve different percentage profits	LB 119
		6.6 Investigation part 3: Do break-even analyses for different small businesses	LB 122
		Finance: Investigation 6: A case study of a small business	TG 201
Data handling	All sections	7.13 Investigation: Are learners in your school at risk of being exposed to second-hand tobacco smoke?	LB 170

Term 2

Topic	Section	Assessment type and name	Page reference
Finance	Interest and interest rates	Finance: Assignment 2: Analyse information about long-term investment and debt/loan scenarios	TG 201
		1.4 Investigation: How much interest can you save by increasing your home loan repayments?	LB 203
	Banking, loans and investments	2.2 Assignment: Choose the best bank fee option for different account types	LB 211
		2.3 Assignment: Use graphs to compare cash withdrawal and deposit fees	LB 218
		Finance: Investigation 7: Compare bank fee options offered to students	TG 204
		Finance: Assignment 3: Compare interest owing on credit card and loan accounts	TG 204
		2.4 Assignment: Use graphs to show investment values with different growth rates and increased premiums	LB 221
		Finance: Assignment 4: Analyse information about a long-term investment	TG 205
		Finance: Investigation 8: Compare bank accounts suitable for stokvel investment	TG 207
		2.6 Investigation: Compare the effects of changing interest rates, investment amounts and repayments on the final value of an investment or a loan	LB 228
	Inflation	3.2 Investigation: Compile a basket of goods table for your own household	LB 237
		3.4 Assignment: Analyse how inflation rates differ for different food items	LB 238
		Finance: Investigation 9: Analyse how inflation will affect different goods and services in your budget	TG 208
		Finance: Assignment 5: Analyse how inflation affects people in different income categories	TG 209
		Finance: Assignment 6: Analyse how inflation affects pensioners	TG 210
		Finance: Investigation 10: Linking income to the inflation rate	TG 210
Measurement	Measuring length/distance	Measurement: Assignment 1: Estimate the lengths of roads and pavements in a settlement	TG 213
		Measurement: Investigation 1: Complete a travel logbook	TG 213
		Measurement: Assignment 2: Calculate vehicle operating costs	TG 214
		Measurement: Assignment 3: Calculate materials and budget for a built-in wardrobe unit	TG 215
		6.4 Investigation: What does a road cost?	LB 300

Measurement	Measuring mass (weight)	Measurement: Investigation 2: Growth patterns in children aged 2 to 20	TG 215
		7.7 Assignment: Compile a table of medicine dosages for paracetamol	LB 319
	Measuring volume	8.4 Assignment: Calculate the run-off rate of rain for a whole neighbourhood	LB 328
		Measurement: Assignment 4: Prepare a set of instructions about *E coli* and water purification	TG 218
	Measuring temperature	9.2 Investigation: Use temperature information to plan a journey	LB 336
		Measurement: Assignment 5: Collect information about temperatures in your home fridge and plan your food storage accordingly	TG 219
	Calculating perimeter, area and volume	Measurement: Investigation 3: Tiling a given area	TG 220
		Measurement: Investigation 4: What is the replacement cost of your home?	TG 221
		10.5 Assignment: Update a construction budget for a house	LB 362
		Measurement: Investigation 5: Quantities and costs of materials for a low-cost house	TG 223
		10.6 Investigation: Housing density where you live	LB 365

Term 3

Topic	Section	Assessment type and name	Page reference
Finance	Taxation	Finance: Assignment 7: Calculate personal income tax for an employee	TG 224
	Exchange rates	2.2 Assignment: Prepare a budget estimate for a foreign trip	LB 403
		Finance: Assignment 8: Plan a holiday in southern Africa	TG 225
Maps and plans	Scale and plans, measurements and costs	3.1 Assignment: Work with floor plans and assembly diagrams	LB 419
		3.5 Assignment: Draw scaled elevation plans and use them to calculate measurements and costs	LB 426
Probability	All sections	4.7 Assignment: Determining and interpreting probabilities for Lotto numbers	LB 442
Maps, plans and other representations of the physical world	Models	5.2 Assignment: Containers and how much they hold	LB 449
		5.3 Investigation: The best shape and size for boxes	LB 449
		5.5 Investigation: Use 3D and 2D scaled models to decide on placement of furniture and fixtures for a fund-raising event	LB 451

Formal assessment: Examinations

In Grade 12, at least one of examination papers should be set, marked and moderated internally unless provincial education departments instruct otherwise.

Time and mark allocation

Grade 12 internal examinations should take place at the end of Term 2 and the end of Term 3. A nationally set external examination will be written at the end of Term 4. For each examination, learners will write two papers. The papers assess the same content in different ways and the cognitive demands of the papers differ (according to the levels of the assessment taxonomy). The time and mark allocations for the papers are given in the table.

Examinations	Paper 1	Paper 2
June examinations **End of Term 2**	2 hours 100 marks	2 hours 100 marks
September examinations **End of Term 3**	3 hours 150 marks	3 hours 150 marks
November examinations **End of Term 4**	3 hours 150 marks	3 hours 150 marks

The main differences between the two papers

Paper 1	Paper 2
• It assesses basic skills in familiar contexts.	• It assesses the ability to apply concepts in familiar and unfamiliar contexts.
• Questions are mainly at levels 1 and 2 (60% of marks at level 1; 35% at level 2).	• Questions are mainly at levels 3 and 4 (35% of marks at level 3; 40% of marks at level 4).
• There are a small number of multi-step procedures (level 3; 5% of marks).	• There are a small number of routine procedures (25% of marks) included to help learners make sense of the contexts in which problems are set.
• Contexts are limited to what is specified in the curriculum outline section of CAPS.	• Contexts may not be familiar to learners, in other words, they are not limited to those specified in the curriculum outline section of CAPS.

Setting internal examinations

Setting an examination paper is a fairly demanding task for most teachers. For this reason, teachers often choose to work together to set different questions/ sections of the paper. We recommend that teachers try as far as possible to work cooperatively to set papers. Where this is not possible at a school, it may be possible to work with other teachers in the district to produce a collection of questions that can be used in examinations at different schools.

When you set an examination (or test) question, you need to keep track of:

- the topics being assessed
- the content/skills being assessed
- the proportion of marks allocated to different taxonomy levels.

A table such as the one below can help you organise and keep track of all the different things you need to consider. This is an exemplar for one question of a Paper 1 examination.

Question details			Content/skills				Taxonomy level					Total
Number	Context	Part	Finance	Measurement	Maps and plans	Data	1 (60%)	2 (35%)	3 (5%)	4 (0 %)	Subtotal	
1	Take-away business (familiar)	1.1 1.2 1.3 1.4	✗	✗	✗	✗	3 4	2 3 4	 2		5 3 6 4	18
												100

Once the table is completed for all questions, you can add up the marks per taxonomy level to check that you have more or less the correct percentage for each level. If not, you can see from the table which levels have too many or too few marks and you can adjust the questions accordingly.

Selecting contexts

When you set examinations, you have to decide on a context for the questions.

For Paper 1, you can select documents, tables, graphs and diagrams from the Learner's Book to use in the examinations. You can then set different questions related to each context. This may be as simple as changing the values used in the Learner's Book to make a new question.

For Paper 2 questions, you need to include some contexts that are familiar (these can again be drawn from the Learner's Book) and some that are not familiar. The media is a good source of new contexts. (Remember that truly mathematically literate adults are able to read and make sense of articles, advertisements, graphs and other mathematical information they come across in daily life). We suggest that teachers keep a file of interesting articles, tables of data, graphs and other mathematically oriented materials they find through the year to use when setting examination questions. For example, during events such as the Comrades Marathon and Two Oceans Marathon, there may be different maps and statistics published in the newspapers. These can be used to set questions based on familiar concepts. Other sporting events, such as the Cape Argus Cycle Tour, the PSL Soccer Finals and even the Olympic Games can be used as the context for questions that are not familiar to the learners.

Below is a section of the schedule of events for the 2012 London Olympics.

Date / time	Sport	Venue
25 July 16:00 – 20:45	Football	Millennium Stadium, Cardiff
	Women's preliminaries (2 matches)	
25 July 17:00 – 21:45	Football	City of Coventry Stadium, Coventry
	Women's preliminaries (2 matches)	
25 July 17:00 – 21:45	Football	Hampden Park, Glasgow
	Women's preliminaries (2 matches)	

Date / time	Sport	Venue
26 July 12:00 – 16:45	Football	Hampden Park, Glasgow
	Men's preliminaries (2 matches)	
26 July 14:30 – 19:15	Football	St James' Park, Newcastle
	Men's preliminaries (2 matches)	
26 July 17:00 – 22:00	Football	Old Trafford, Manchester
	Men's preliminaries (2 matches)	
26 July 19:45 – 21:45	Football	Millennium Stadium, Cardiff
	Men's preliminaries (1 match)	
26 July 19:45 – 21:45	Football	City of Coventry Stadium, Coventry
	Men's preliminaries (1 match)	

You could use the above schedule to set a question that assesses the concepts and skills related to time, distances between places, travelling problems, costs and even probability in an unfamiliar context. You could also combine it with maps and/or plans of a soccer field to set parts of questions in which learners use the scale to determine dimensions and then analyse the layout of the venue in terms of seating, access, location of exits and other issues. Similarly, you could combine this with graphs that show medals by country and ask the learners to answer questions and analyse the data provided.

SECTION 3

UNIT-BY-UNIT

Dealing with different levels in the Mathematical Literacy assessment taxonomy

CAPS provides an assessment taxonomy framework to help teachers make sure their assessment meets different levels of cognitive demand. Some tasks and questions require only the recall of basic facts or simple calculations while others require learners to analyse and make sense of unfamiliar contexts and use varied methods and skills to solve problems.

The four levels of cognitive demand are:
Level 1: Knowing
Level 2: Applying routine procedures in familiar contexts
Level 3: Applying multi-step procedures in a variety of contexts
Level 4: Reasoning and reflecting.

When you design assignments, investigations, tests and examinations, you need to ensure that the number of marks allocated to questions is roughly in the following proportions (about 5% in overall allocation).

Taxonomy level	Marks allocated to each level
Level 1	30%
Level 2	30%
Level 3	20%
Level 4	20%

In examinations, the focus of the different papers means that the percentage marks for different levels vary per paper, but they give the same overall percentages when combined (about 5% variance in allocations). These are given below.

Taxonomy level	Paper 1 allocation	Paper 2 allocation	Overall allocation
Level 1	60%	–	30%
Level 2	35%	25%	30%
Level 3	5%	35%	20%
Level 4	–	40%	20%

How the levels are built into the activities in this course

In order to prepare learners for tests, examinations and other formal assessment tasks, they need to practise answering questions at all levels on the taxonomy. The Learner's Book provides exercises and activities in each topic that fall into and across different levels of the Mathematical Literacy taxonomy.

The tables that follow contain examples of questions, calculations and exercises from each term's work sorted by level to show the differences between the demands of questions at different levels of the taxonomy.

Note that these tables do **not** list all the questions/activities in the Learner's Book and this Teacher's Guide, they are intended only a general guide to help you select and/or develop suitable assessment questions of your own and to show that provision is made for each level in the course materials.

Term 1: Measurement

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 1 Measuring units and conversions	Convert between metric units 1.1 questions 1–22	Convert from imperial to metric units 1.1 questions 1–22	Make a scaled drawing and enlarge it using an appropriate conversion factor 1.2 question 2	Design a bookshelf, selecting appropriate scale and units 1.3 questions 1–4 Create a conversion table based on body-measurements Measurement: Investigation 1: questions 1–5
Unit 2 Time		Read values and use them to record and calculate time 2.1 questions 1–3	Interpret time values on a timetable and answer questions related to times 2.2 questions 1–2 Measurement: Investigation 3: questions 1–4	Perform time calculations and relate them to other travel resources in order to plan a trip 2.4 questions 1–2 2.7 questions 1–3

Term 1: Finance

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 3 Financial documents at home and at work	Read information from financial documents 3.2 question 1 3.4 questions 1–3 Show how the total due was calculated on an account 3.2 question 2	Find relevant information in the Tax Pocket Guide and use it to answer questions related to tax liabilities 3.5 questions 1–14	Interpret information on different financial documents and make sense of terms and conditions 3.4 questions 1–3	Design a filing and/or record-keeping system for financial documents Finance: Investigation 1: questions 1–2

Unit 4 **Tariffs**	Read tables of different tariffs 4.1 question 1 4.2 question 1	Calculate costs and tariffs using given information 4.1 questions 2, 4 4.2 question 1 Complete a table of tariffs using given information 4.3 question 1 Finance: Assignment 1: question 1	Draw graphs to represent and compare different tariffs 4.6 question 1–2	Choose appropriate strategies (including using table and drawing graphs) to compare the costs of services and tariffs in different contexts 4.1 question 3 Finance: Investigation 2: questions 1–4
Unit 5 **Income-and-expenditure statements and budgets**	Classify items on an income-and-expenditure statement 5.1 question 1 5.6 questions 1–2 Calculate amounts on statements 5.2 questions 2–8	Prepare an income-and expenditure statement 5.2 question 1 Prepare an income-and-expenditure statement 5.3 questions 1–5	Analyse an income-and-expenditure statement for a small business 5.4 question 3 Prepare a budget for a single event Finance: Investigation 4: question 1	Analyse a budget and make recommendations to improve finances 5.5 questions 1–3 5.6 questions 1–3
Unit 6 **Cost price, selling price and break even analysis**	Identify different types of costs 6.1 questions 1–2 Find the cost price of an item by adding all the component costs 6.2 questions 1–4 Calculate break-even values in the context of a given problem 6.5 question 1	Compare cost and selling price and calculate the mark up 6.3 questions 1–5 Read values from graphs to find the break-even point and answer questions about it 6.5 question 2	Investigate various costs and decide on an appropriate selling price 6.4 questions 1–2 Calculate selling prices based on various profit levels and decide which is reasonable 6.4 questions 3–5 Draw graphs to compare options and tariffs 6.6 question 2	Conduct market research and use the results to suggest and defend the selling price of an item Finance: Investigation 6: questions 1–3

Term 1: Data handling

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 7 **Data handling**	Read information from a table of results 1.1 question 1 Read data from a given frequency table 7.1 question 2 7.4 question 1 Locate values on box-and-whisker plots 7.8 questions 1–2 Read values directly from graphs 7.2 question 3 7.8 questions 1–3	Decide whether a sample is representative 7.2 question 1 Complete a table to summarise data collected during a survey 7.4 question 2 Calculate the mean, median, mode range and interquartile range 7.5 questions 1–2 7.7 questions 1–2 Draw and label graphs 7.9 question 3	Decide on appropriate questions to include on a questionnaire and then conduct the survey 7.2 question 2 7.11 question 1 Use raw data to draw up a grouped frequency table and answer questions based on the table 7.4 question 3 Choose the most appropriate form of graph to represent different sets of data, giving reasons for choices 7.9 question 1–3 7.11 question 1	Critique the questions and posted results of a survey 7.3 question1 1–2 Analyse measures of spread and central tendency to make deductions about trends in the data 7.6 questions 1–3 Analyse graphs and make deductions about trends in the data and predictions for the future 7.9 questions 1–5 Interpret and critically analyse data presented in the form of different graphs 7.10 questions 1–4 7.11 question 2

Term 2: Finance

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 1 Interest and interest rates	Read and calculate interest rates 1.1 question 1–2	Calculate simple interest rates and monthly repayments 1.1 question 3 Finance: Assignment 2: questions 1–2	Perform compound interest calculations over multiple time periods 1.1 question 6 Use tables to model different interest options and answer questions based on the result Finance: Assignment 2: question 3–4	Investigate and model the effect of different interest rates on payments and total cost of loans 1.2 questions 1, 2 1.3 questions 1–3
Unit 2 Banking, loans and investments	Identify fees and costs on bank documents 2.1 questions 1–2	Calculate the value of an investment Finance: Assignment 4: questions 3–6 Use graphs to show and compare contributions and payments 2.5 questions 1–2	Complete a table/graph to compare bank fee options Finance: Assignment 7: question 1–4 Calculate and compare interest on credit card and loan accounts Finance: Assignment 3: questions 1–3	Compare fee options and investigate the best one for a particular person 2.1 question 2–3 2.2 question 1 Choose the best banking option for a business and justify choices 2.1 question 4 Make decisions regarding investment options without scaffolded or guided questions 2.4 questions 1–4

Unit 3 **Inflation**	Calculate price changes and rates of change 3.1 questions 1–2 3.3 Quesitons 1–3	Show by calculation how the price of an item changes when it is affected by inflation 3.1 questions 3–4 Read and interpret graphs of inflation rates to answer questions about them 3.5 questions 1–4	Show by calculation how the price of an item might change if affected by inflation over multiple time periods 3.4 questions 1–6 Finance: Investigation 10: question 3	Compile a basket of goods index table for a household 3.2 Investigation

Term 2: Maps, plans and other representations of the world

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 4 **Scale**	Explain the meaning of a given scale 4.1 question 1	Use a given scale to determine actual measurements 4.1 questions 2–3 4.2 questions 1–2 Use real measurements to determine scale of a plan/map 4.4 questions 1–3	Use real distances to calculate measurements on a plan 4.3 questions 1–2 Use a given or determined scale together with measurements on a plan to determine length and other dimensions 4.5 questions 1–3	Make decisions about costs and modes of transport based on information available 4.5 question 3
Unit 5 **Maps**	Describe the position of objects on a map 5.1 questions 1–3 Read an index to find the location of streets 5.1 questions 2–4	Interpret and follow a given set of directions and provide a set of directions between two places 5.2 questions 1–3 5.5 questions 1–5 Calculate time, distance and speed based on maps 5.2 question 4	Use different maps and directions to find possible routes between places 5.6 questions 1–3 Identify a route between places on a map, measure the distance and use the scale to estimate distance between places 5.4 questions 1–8	Make decisions about stopping points and modes of transport on a journey based on information available 5.5 questions 1–4 5.7 questions 1–8 Compare marathon routes using a map and an elevation map and answer questions related to the routes 5.8 questions 1–7 Revision question 4

Term 2: Measurement

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 6 Measuring length and distance	Estimate measurements using sensible cues 6.1 questions 1–8	Calculate using estimated measurements and costs Measurement: Assignment 1: questions 2–5 6.2 questions 1–2	Calculate overall costs using given measurements and costs Measurement: Assignment 3: questions 1–6	Calculate operating costs for a vehicle using given, estimated and calculated distances and costs Measurement: Assignment 2: questions 1–3
Unit 7 Measuring mass	Measure and record mass 7.1 questions 2–3 Read mass from growth charts and graphs 7.2 questions 1–2	Calculate using measured values to determine BMI 7.1 question 1 Read and compare data about mass and BMI 7.3 question 1–5	Calculate correct portion sizes 7.6 questions 1–2 Compile a table of medicine doses for paracetamol 7.7 questions 1–3	Investigate and compare growth patterns of children aged 2–20 Measurement: Investigation 2: questions 1–5
Unit 8 Measuring volume		Calculate volumes for practical purposes 8.1 questions 1–4 Calculate concentration and other rates by volume Measurement: Assignment 4: question 1 7.6 questions 1–4 7.5 question 1	Calculate basic water needs using data from tables and other sources 8.3 questions 1–7 Use measured values in conjunction with other skills to complete an assignment on water run off in a settlement 8.4 questions 1–5	Use calculated values and given information to produce guidelines about water safety 8.5 question 2
Unit 9 Measuring temperature	Measure and record temperature 9.3 questions 1–2 Read and convert temperatures using a map 9.1 questions 1–4	Draw tables of temperatures and compare patterns 9.3 questions 4–5		Use temperature information to plan a journey 9.2 questions 1–3

Unit 10 Calculating perimeter, area and volume	Measure accurately 10.1 questions 1-4 Identify from a given table which formula are needed for different calculations 10.2 questions 1–2	Calculate perimeter and area by substituting values into formulae 10.2 question 3 Use formulae to find surface area and volume 10.2 question 4	Break composite shapes into more familiar pieces and find the area of each in order to find the area of the whole 10.3 questions 1–6 Work out the dimensions you need to find the surface area and volume of an irregular solid and then use these to find the surface area and volume 10.4 questions 1–2	Use perimeter, area and volume calculations to complete a larger project without being told what calculations are needed 10.4 questions 3–6 Measurement: Investigation 4

Term 3: Finance

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 1 Taxation	Read VAT information from a table 1.1 question 2 Read information from a pay slip 1.1 question 3	Calculate VAT and inclusive prices 1.1 question 1 Use tax tables and formulae 1.2 questions 1–3	Calculate UIF for different time periods 1.1 questions 4–6 Calculate taxable income and tax payable 1.3 questions 1–4	Analyse tax documents and answer questions related to income tax 1.4 questions 1–4 Complete a tax return form and calculate income tax for an employee Finance: Assignment 7: questions 1–3
Unit 2 Exchange rates		Use given exchange rates to determine the value of one currency for a given value of another 1.1 questions 1–2 1.2 questions 1–4	Perform currency conversion calculations related to the buying power of the currency 2.3 questions 1–3	Explain how a strong or weak currency affects prices in different countries 2.4 questions 1–7 Plan and budget for a trip using currency exchange rates and other travel-related sources Finance: Assignment 8

Term 3: Maps, plans and other representations of the world

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 3 **Scale and plans**	Read values and dimensions from a diagram and/or design drawing 3.1 question 1 Read instructions on an assembly diagram 3.1 question 3	Use given information to identify the numbers of different features on a plan 3.2 questions 1–4 3.3 questions 1–5	Use plans in conjunction with other information to determine materials needed and/or costs 3.5 questions 2–3	Describe items represented on a plan 3.1 question 2 Decide on an appropriate scale in which to draw a plan and then draw it 3.5 question 1

Term 3: Probability

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 4 **Probability**	Use terms associated with probability correctly 4.1 question 1 Identify all possible outcomes for an event using a tree diagram 4.6 question 1	Express probability in percentages and numbers 4.2 questions 1–6 4.5 questions 2–3 Calculate the odds of an event 4.3 questions 1–2	Identify values from a table and use them to express the probability of certain events 4.6 question 2 4.7 questions 1–2	Use a table of probabilities to assess the chance of different outcomes and comment on the results 5.7 questions 1 and 4–6 Critically assess the use of probability values in media sources and advertisements 4.4 question 2 4.6 questions 3–5 4.7 questions 1–2

Term 3: Maps, plans and other representations of the world

Unit	Level 1: Knowing	Level 2: Applying routine procedures in familiar contexts	Level 3: Applying multi-step procedures in a variety of contexts	Level 4: Reasoning and reflecting
Unit 5 Using models to investigate shape and space	Draw the net of a cuboid 5.1 question 1	Build a model of a container 5.1 question 2 5.2 question 1 Build a model of a simple building given a net and dimensions 5.4 questions 1–4	Build a model and use to solve problems 5.1 questions 3–6 5.2 questions 2–4 5.3 questions 1–3	Use a model to analyse the space available and make a decision about the best placement of items to maximise available space 5.5 questions 1–2

TERM 1

WORKED ANSWERS

You may want to reorganise the pages in this file so that the tables with taxonomy levels for assessment are next to the worked solutions for each term. Remember though that the tables contain examples of activities that fall into each level of the taxonomy and they do not contain a definitive or complete list.

Unit 1
Measuring units and conversions

Learner's Book pages 2–6

Teaching tips

- This unit revises work on measuring units and conversions done in Grades 10 and 11, and provides activities in which learners apply conversion skills to various practical activities in real-world contexts. Adapt and extend these activities to suit the interests of learners and the needs of their local environment, where relevant. The conversion tables that learners need to use for the activities are given in the Learner's Book.
- Learners should also be given further practice in reading measurements off the scales used on measuring instruments. Try to provide a range of instruments in the classroom that would be used for different practical purposes – for example, a builder's tape measure and a medical syringe.
- A section on digital information (computer) measuring units is included in the unit because, in practical situations, it is often necessary to judge whether a computer hard drive, memory stick, CD and so on have enough space to store a digital file. It is also necessary to understand units such as megabytes (MB) and gigabytes (GB) when taking out a cellphone contract that includes an internet function.
- The section on measuring food energy will give learners insight into how measuring units (kJ and calories) are used in the popular media and in medical reports to describe healthy and unhealthy diet options.
- Some activities in this and later measurement units can be turned into real-world projects for the benefit of the learners and the local community.

Solutions

1.1 **Test** your conversion skills

Learner's Book page 2

1. Conversion of 9 553 m

a. 955,3 cm **b.** 9 553 mm **c.** 31,34 ft **d.** 376,1 in.

2. Conversion of 450 yards

a. 0,41 km **b.** 409,5 m **c.** 0,26 miles **d.** 1 350 ft

3. Conversion of 0,06 m

a. 6 cm **b.** 60 mm **c.** 2.36 in. **d.** 0,2 ft

4. Conversion of 726,12 mm
- **a.** 72,612 cm
- **b.** 0,72612 m
- **c.** 28,58734 in.
- **d.** 0,79147 yd

5. Conversion of 79,4 km
- **a.** 79 400 m
- **b.** 86 832,9 yd
- **c.** 49,34 miles

6. Conversion of 12 000 miles
- **a.** 21 120 000 yd
- **b.** 19 312,13 km
- **c.** 19 312 128 m
- **d.** $2{,}04269 \times 10^{-9}$

alternatively: 0,064 light seconds
or 10 427 nautical miles

7. Conversion of 833 g
- **a.** 0,833 kg
- **b.** 833 000 mg
- **c.** 29,383 oz
- **d.** 1,836 lb

8. Conversion of 555,045 kg of water
- **a.** 555 045 g
- **b.** 0,555045 tonnes
- **c.** 1 223,65 lb
- **d.** 555,045 ℓ

9. Conversion of 0,035 g of water
- **a.** 35 mg
- **b.** 0,00123 oz
- **c.** 0,035 ml

10. Conversion of 467 210 mg of water
- **a.** 467,21 g
- **b.** 0,46721 kg
- **c.** 0,46721 ℓ

11.

Conversion of 17,54 t (metric ton (tonnes))	17,54 (short ton)
a. 17 540 kg	15 912,29 kg
b. 38 669,08 lb	35 080,59 lb
c. 17,26298 ton (Imp)*	15.6607 ton (Imperial)*

* An Imperial ton is also called a long ton.

12. Conversion of 41 067,85 kg
- **a.** 41 067 850 g
- **b.** 1 448 625,78 lb
- **c.** 40,41925 tons (Imp) = 41,068 t (metric)

13. Conversion of 0,05 ℓ
- **a.** 50 ml
- **b.** 1,6907 US fl.oz. = 1,7598 UK fl.oz.
- **c.** 0,10567 US pints or 0,08799 UK pints

14. Conversion of 664 500 ml
- **a.** 664,5 ℓ
- **b.** 0,6645 kl
- **c.** 175,542 (US) gal. = 146,17 gal. (UK)

15. Conversion of 950,12 ℓ
- **a.** 0,95012 kl
- **b.** 950 120 ml
- **c.** 2 007,9612 US pints or 1 671,97746 UK pints

16. Conversion of 0,6905 kl
- **a.** 690,5 ℓ
- **b.** 690 500 ml
- **c.** 23 348,5827 fl.oz. (US) or 24 302,2026 UK fl.oz.

17. Conversion of 3 030 cm^2
- **a.** 0,3030 m^2
- **b.** 303 000 mm^2
- **c.** 469,651 $in.^2$

18. Conversion of 0,5 m^2
- **a.** 5 000 cm^2
- **b.** 500 000 mm^2
- **c.** 775,002 $in.^2$

19. Conversion of 45,45 km^2

a. 45 450 000 m^2 **b.** 4 545 ha

c. 11 230,94 acres

20. Conversion of 1 200 cm^3 Conversion of 1 200 cm^2

a. 1 200 000 mm^3 120 000 mm^2

b. 0,0012 m^3 0,12 m^2

c. 0,0423776 ft^3 1,2917 ft^2

21. Conversion of 18 000 m^2

a. 0,018 km^2 **b.** 1,8 ha

c. 4,448 acres

22. Conversion of 44 081 s (seconds)

a. 44 081 000 milliseconds **b.** 734,68333 min.

c. 0,5102 days

23. Conversion of 3,5 decades

a. 0,35 centuries

b. 12 783,75 days (1 year = 365,25 days)

c. 306 810 hours

24. Conversion of 100 km/h

a. 100 km/h
= 100 000 m/h
= 100 000 m/60 min.
= 1 666,67 m/min.

b. 1 666,67 m/min × 166 666,67 cm/min.
= 166 666,67 cm/60 s
= 2 777,78 cm/s

c. 2 777,78 cm/s × 27 777,78 mm/s
= 27 777,78 mm/1 000 mm/s
= 27,78 mm/ms

1.2 **Practise** using conversions in practical activities

Learner's Book page 4

1. a. l = 1 000 mm

b = 500 mm

$p = 2l + 2b$
= 3 000 mm
= 300 cm

b. $A = l \times b$
= 420 mm × 500 mm
= 210 000 mm^2

c. 210 000 mm^2
= 0,21 m^2

d. i. $l \times b \times h - (l \times b \times h - \pi r^2 h)$ (used 3,14286 for π)
= {530 × 400 × 170 – ([50 × 50 × 170] – [π(25)^2 × 170])} mm^3
= [36 040 000 – (425 000 – 333 928,875)] mm^3
= (36 040 000 – 91 071,125) mm^3
= 36 030 828,88 mm^3

ii. 36 030 828,88 mm^3 = 36 030,82888 ml
= 36,03082888 ℓ
The capacity of the sink is about 36 ℓ.

2. **a.** Plan with imperial measurements
   b. Enlargements
   c. Total plot area = 0,5 ha
   = 5 000 m^2
   Number of households = 55
   Size of RDP house = 20 m^2
   Number of households × size of house = area required
   1 100 m^2 < 5 000 m^2
   There is sufficient space for each household to have a house.
   d. 5 000 m^2 ÷ 55 households = 90,91 m^2
   Each household can have a plot of 90,91 m^2 comprising the house (20 m^2) and a yard of 70,91 m^2 (assuming no area is required for roads and/or services).

1.3 **Assignment:** Convert and calculate measurements

Learner's Book page 6

1. **Instructions in metric measurements**
   We made the case out of materials available at most building supply dealers and lumberyards, including 25 mm × 51 mm, 25 mm × 102 mm and 25 mm × 254 mm common pine and 6,4 mm thick plywood. Assembly is quick and easy with glue and nails, and when you're done with construction you have the option of a painted or clear finish.
   The specifications that follow will produce a bookcase with overall dimensions of 273 mm deep × 864 mm wide × 1 219 mm tall. While the depth of the case is directly tied to the 25 mm × 254 mm standard plank, you can vary the height, width and shelf spacing to suit your needs. Keep in mind, though, that extending the width of the cabinet may require the addition of central shelf supports.
2. **Sizes in metric units**
   We made the case out of materials available at most building supply dealers and lumberyards, including 32 mm × 44 mm, 32 mm × 94 mm and 32 mm × 300 mm planed all round pine planks and 6 mm-thick plywood (in 2 440 mm × 1 220 boards). Assembly is quick and easy with glue and nails, and when you're done with construction you have the option of a painted or clear finish.
   The specifications that follow will produce a bookcase with overall dimensions of 306 mm deep × 964 mm wide × 1 200 mm tall. While the depth of the case is directly tied to the 32 mm × 300 mm standard plank, you can vary the height, width and shelf spacing to suit your needs. Keep in mind, though, that extending the width of the cabinet may require the addition of central shelf supports.

   Dimensions of bookcase according to new
   Depth: 300 mm width of plank plus 6 mm plywood backing = 306 mm
   Length: 900 mm of plank + 2 × 43 mm width of plank (for each side)
   = 964 mm
   Height: 1 200 mm length of plank
3. **Wood required**
   Note: The 32 mm × 44 mm and 32 mm × 94 mm planks were not used.

   Sides
   Two sides are required per bookcase.
   Length required per side is 1 200 mm (adjusted from US plan) for the height of the bookcase.

Plank required: 32 mm depth × 300 mm width × 2 400 mm length
One plank gives two side lengths with no offcuts.
Therefore, one plank is required per bookcase.
Therefore, 14 planks are required to build 14 bookcases.

Shelving

No number of shelves is specified.
To make three shelves for each bookcase,
four lengths of shelving are required (three shelves and the top plank) for each bookcase.
Length of bookcase required: 964 mm (adjusted from US plan)
Length of plank required: 900 mm
Plank required: 32 mm depth × 300 mm width × 1 800 mm length
One plank gives two shelves with no offcuts.
Therefore, two planks are required per bookcase.
Therefore, 28 planks are required to build 14 bookcases.

Plywood for backing

6 mm thick plywood in 2 400 mm × 1 220 sheets can be used.
Dimensions per bookcase: 964 mm wide × 1 200 mm length
Match the height of the bookcase (1 200 mm) to the width of the plywood sheet (1 220 mm).
Number of bookcases per sheet: $\frac{2\ 440\ \text{mm}}{964\ \text{mm}}$ = 2,531 bookcases per sheet
$\frac{14\ \text{bookcases}}{2{,}531\ \text{bookcases}}$ per sheet gives 5,53 bookcases
Therefore six sheets of plywood are required.

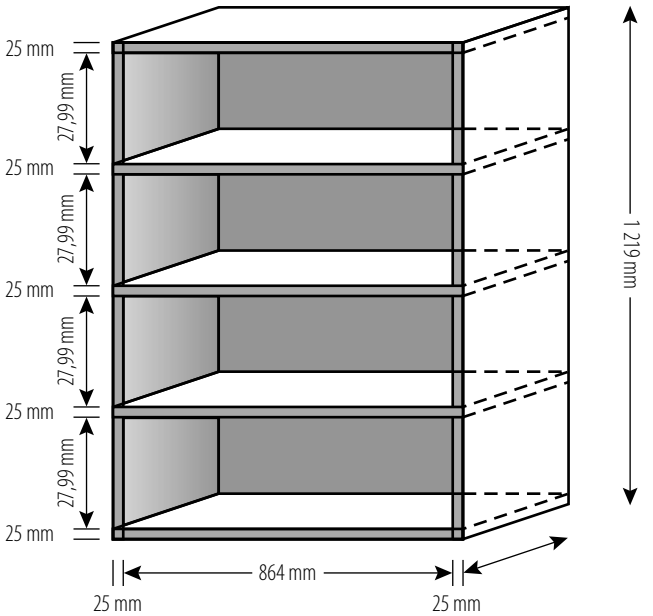
4. Leftover wood

Planks

No 32 mm depth × 300 mm width planks are left over from the sides or the shelves.

Plywood

Six sheets of 2 400 mm × 1 220 mm plywood (with a thickness of 6 mm) are required.
Total: 17 860 800 mm^2 plywood
Plywood used: 1 200 mm × 964 mm × 14 bookcases
= 16 195 200 mm^2 plywood
Unused plywood: 17 860 800 mm^2 – 1 665 600 mm^2 of plywood
= 1,6656 m^2 of plywood



Unit 2
Measuring time

Learner's Book pages 7–33

Teaching tips

- In this unit, learners focus first on recording elapsed time, and then on interpreting timetables that are used in a wide range of practical contexts. These skills will be applied as well in units in the finance topic that involves planning travel activities.
- The section on speed and average speed revises calculating average speed (which was covered in Grade 10 and Grade 11) before applying this method to sporting and transport situations.
- A table is provided in the Learner Book with guidelines for using timetables to budget for a trip. Learners can use this table to help them with the activities in later units that involve planning journeys. The travel investigation in this unit applies to South African destinations, and will help learners to prepare for later investigations that involve travel to foreign destinations.
- The last section of the unit focuses on time zones, and the activities in this section give learners the opportunity to think about how to plan travel and communication between places in different time zones.

Solutions

2.1 **Test** your ability to read time formats and calculate elapsed time

Learner's Book page 9

1 **a.** Clock A: 05:12
Clock B: 21:47
21 h – 5 h = 16 h
47 min. – 12 min. = 35 min.
Elapsed time: 16:35

b. Clock C: 13:59
Clock A: 05:12
(5 + 24) – 13
= 29 – 13
= 16 h
(12 + 60) – 59 = 13 min.
Elapsed time: (16 – 1):13 = 15:13

c. Clock F: 23:01
Clock D: 01:01
(1 + 24) – 23 = 2 h
1 – 1 = 0 min.
Elapsed time: 2:00

d. Clock I: 02:53 h
Clock J: 17:16 min.
17 – 2 = 15
(60 + 16) – 53 = 23
Elapsed time: (15 – 1):23 = 14:23

e. Clock E: 15:23
Clock H: 06:12
(06 + 24) – 15 = 15 h
(12 + 60) – 23 = 49 min.
Elapsed time: (15 – 1):49 = 14:49

2. **a.** Clock A: 05:12
Clock J: 17:16
17 – 5 = 12 h
16 – 12 = 4 min.
Elapsed time: 12:04
Clock C: 13:59
Clock E: 15:23
15 – 13 = 2 h
(23 + 60) – 59 = 24 min.
Elapsed time: (2 – 1):24 = 1:24
Total elapsed time: 12:04 + 1:24 = 13:28

b. Clock G: 18:44
Clock H: 06:12
(06 + 24) – 18 = 12 h
(12 + 60) – 44 = 28 min.
Elapsed time: (12 – 1):28 = 11:28
Clock B: 21:47
Clock G: 18:44
(18 + 24) – 21 = 21 h
(44 + 60) – 47 = 57 min.
Elapsed time: (21 – 1):57 = 20:57
Total elapsed time: 11:28 + 20:57 = 32:25

c. Clock I: 02:53
Clock C: 13:59
13 – 2 = 11 h
59 – 53 = 6 min.
Elapsed time: 10:06
Clock D: 01:01
Clock A: 05:12
5 – 1 = 4 h
12 – 1 = 11 min.
Elapsed time: 4:11
Total elapsed time: 10:06 + 4:11 = 15:17

d. Clock F: 23:01
Clock I: 02:53
(02 + 24) – 23 = 3 h
53 – 01 = 52 min.
Elapsed time: 3:52
Clock E: 15:23
Clock B: 21:47
21 – 15 = 6 h
47 – 23 = 24 min.
Elapsed time: 6:24
Total elapsed time: 3:52 + 6:24 = 9 h + 76 min.
= 10 h + 16 min.
= 10:16

e. Clock A: 05:12
Clock B: 21:47 h
21 – 5 = 16 min.
47 – 12 = 35
Elapsed time: 16:35
Clock C: 13:59
Clock D: 01:01
(24 + 1) – 13 = 12 h
(1 + 60) – 59 = 2 min.
Elapsed time: (12 – 1):11 = 11:11
Clock E: 15:23
Clock F: 23:01
23 – 15 = 8 h
(60 + 1) – 23 = 38 min.
Elapsed time: (8 – 1):38 = 7:38
Clock G: 18:44
Clock H: 06:12
(06 + 24) – 18 = 12 h
(12 + 60) – 44 = 28 min.
Elapsed time: (12 – 1):28 = 11:28

Elapsed time

Clock A and B	$1^{1}6{:}35$
Clock C and D	11:02
Clock E and F	7:38
Clock G and H	11:28
	46:43

3.

Clock	Start time	Finish time	Duration	Ranking
A	12:29:00	14:12:08	1:43:08	7
B	15:02:00	16:19:21	1:17:21	4
C	15:02:00	16:07:30	1:05:30	1
D	12:29:00	14:17:16	1:48:16	8
E	15:02:00	16:07:30	1:05:30	1
F	12:29:00	14:11:53	1:42:53	6
G	15:02:00	16:08:02	1:06:02	3
H	12:29:00	14:09:44	1:40:44	5

2.2 **Practise** finding information on transport timetables

Learner's Book page 11

1. a. The schedule was published on 1 February 2011 for the U2 concert to be held on 13 February 2011.

b. The schedule is only valid for 13 February 2011.

c. Six train journeys are set out in the schedule.

d. The train arrives at and departs from each station at the times indicated. A passenger would use the time to know when to be at a station to be in time for its departure, to know when the train will arrive at and depart from Nasrec where the concert will take place, and when the train is scheduled to arrive at the station the passengers are going to. When trains stop at a station, they only stop for a minute before departing.

e. The inward journey's duration is the same as the outward journey's duration.

Springs – Nasrec	1 h 45 min.
Nasrec – Springs	1 h 45 min.
Randfontein – Nasrec	1 h 13 min.
Nasrec – Randfontein	1 h 13 min.

f. The scheduled arrival time of the inbound trains to Nasrec arrive at 16:15 (Springs train) and 16:28 (Randfontein). These trains arrive before the start of the concert. The trains are scheduled to depart after midnight when the concert has finished.

2. a. There are flights from Accra to Johannesburg on the second and fifth days of the week.

b. The flight from Accra lands at Johannesburg at 06:35 local time on the next day.

c. There will only be one scheduled flight per week from Bulawayo to Johannesburg – on the Sunday.

d. Yes, SAE536 departs Bloemfontein at 17:30 and arrives at Durban at 18:35.

e. All seven days are indicated on the schedule for flights between Bloemfontein and Johannesburg.

f. Flight departure (local time): 17:55
Arrival time (South African time): 08:10
South Africa is five hours ahead of Buenos Aires.
Duration of flight
= (24:00 – 17:55) + 08:10 – 05:00
= 06:05 + 08:10 – 05:00
= 14:15 – 05:00
= 09:15
The duration of the flight is 9 hours and 15 minutes.

g. Five times per week (Wednesday to Sunday)

h. There is no time difference between Cairo and Johannesburg.
Departure time: 23:00
Arrival time: 07:05
Duration: 01:00 + 07:05 = 08:05
The duration of the flight is 8 hours and 5 minutes.

i. No you cannot fly from Bujumbura to Johannesburg on a Tuesday.
There are only direct flights from Bujumbura to Johannesburg on Mondays, Wednesdays and Saturdays.
To fly on a Tuesday from Bujumbura to Johannesburg, you would have to fly to Kigali on SA088 and then fly to Johannesburg.

j No, you can only fly economy class from Bulawayo to Johannesburg.

2.3 **Practising** reading and interpreting production timetables

Learner's Book page 17

1. October–December is the best time to harvest coffee beans in Yemen.

2. The best time to harvest coffee beans in Ethiopia varies between November and February.

3. Kenya has two crops per year: A main crop between October and March and a second crop (fly crop) between May and August.

4. November to February is the best time to ship coffee beans from Tanzania to Uganda.

5. The harvest period in Zimbabwe is from July to October.

2.4 **Practise** completing and drawing up production schedules

Learner's Book page 18

1. Answers will differ.

2.

Task	Preparing soil for planting	Sow seeds for different crops	Apply fertiliser (state type)	Harvest crop
Month				
August				
September	✔			
October		✔ sow all seeds	✔ 2:3:4 (30)	
November			✔ LAN	
December				
January				Harvest gem squash and butternut
February				Harvest Hubbard squash and pumpkin

Task	Preparing soil for planting	Sow seeds for different crops	Apply fertiliser (state type)	Harvest crop
March				
April				
May				
June				
July				

2.5 **Practise** reading and comparing tide timetables

Learner's Book page 21

1. Answers will differ.
2. 26 and 27 January would be the best time to photograph the moon's reflection on the calm ocean water as it is full moon at the time.
3. The spring tide was on 13 January. High tide was at 04:43. Other suitable days are 14 and 15 January and 27 to 31 January.
4. Learners discuss and motivate their answers.

2.6 **Practise** calculating average speeds

Learner's Book page 23

1. **a.** Record the departure and arrival times and measure the distance travelled by each vehicle over a typical period of time, such as a typical month or week. The owner could then determine the average speed for each vechicle for the period.

b. Car deliveries

Delivery	1	2	3	4	5
Start delivery	08:31	09:56	14:48	10:12	15:25
Complete delivery	09:14	11:14	16:50	13:37	16:09
Elapsed time	43 min.	1 h 18 min.	2 h 2 min.	3 h 25 min.	44 min.
Distance (km)	9,3 km	44,7 km	51,0 km	156,2 km	12,3 km
Speed (km/h)	13	34,4	25,1	45,7	16,8

Average speed: 27 km/h

Bakkie deliveries

Delivery	1	2	3	4	5
Start delivery	09:15	11:37	13:20	08:26	14:10
Complete delivery	10:05	12:58	15:19	11:12	14:58
Elapsed time	50 min.	1 h 21 min.	1 h 59 min.	2 h 46 min.	48 min.
Distance (km)	68,3	49,1	81,6	137,2	31,0
Speed (km/h)	82	36,4	41,1	49,6	38,8

Average speed: 49,58 km/h rounded off to 50 km/h

Bicycle deliveries

Delivery	1	2	3	4	5
Start delivery	8:12	09:29	12:18	16:02	10:05
Complete delivery	8:48	10:12	13:01	16:48	10:47
Elapsed time	36 min.	43 min.	43 min.	46 min.	42 min.
Distance (km)	7,9	9,8	8,2	3,0	8,6
Speed (km/h)	13,2	13,7	11,4	3,9	12,3

Average speed: 10,9 km/h rounded off to 11 km/h

Motorcycle deliveries

Delivery	1	2	3	4	5
Start delivery	9:45	11:21	13:09	15:37	8:24
Complete delivery	10:38	12:23	13:46	16:48	11:18
Elapsed time	53 min.	1 h 2 min.	37 min.	1 h 11 min.	2 h 54 min.
Distance (km)	22,9	38,6	11,5	53,8	149
Speed (km/h)	25,9	37,4	18,6	45,5	51,4

Average speed: 35,76 km/h rounded off to 36 km/h

c. The two most efficient vehicles are the bakkie (with an average speed of 50 km/h) and the motorcycle (with an average speed of 36 km/h).

d. The owner should consider the capacity of each vehicle (the bakkie can carry the largest load), the typical size of goods that are delivered (large or small), where goods need to be delivered (are goods couriered within the city/town centre where traffic is heavy), and the distance of the deliveries (the average distance of the bakkie's deliveries are 73,44 km, the car is 54,7 km, the average for the motorcycle is 55,16 km and the average for the bicycle is only 7,5 km).

2. a

Athlete	Event	Average speed
Usain Bolt	100 m	37,38 km/h
Usain Bolt	200 m	37,31 km/h
Michael Johnson	400 m	33,11 km/h
David Rudisha	800 m	28,54 km/h
Noah Ngeny	1 500 m	25,46 km/h
Kenenisa Bekele	5 000 m	23,14 km/h
Kenenisa Bekele	10 000 m	22,21 km/h
Samuel Wanjin	Marathon*	20,01 km/h

b.

Athlete	Event	Average speed
Florence Griffith-Joyner	100 m	33,90 km/h
Florence Griffith-Joyner	200 m	33,74 km/h
Marie-José Pérec	400 m	29,84 km/h
Nadezhda Olizarenko	800 m	25,39 km/h
Paula Ivan	1 500 m	23,08 km/h
Gabriela Szabo	5 000 m	20,44 km/h
Tirunesh Dibaba	10 000 m	20,06 km/h
Tiki Gelana	Marathon*	17,69 km/h

* The marathon is 42,195 km.

c. Class discussion.

3.

Event	Average speed of men's record (km/h)	Average speed of women's record (km/h)	Average speed of the women's record as a percentage of average speed of men's record
100 m	37,38	33,90	$\frac{33,9}{37,38} = 91\%$
200 m	37,31	33,74	$\frac{33,74}{37,31} = 90\%$
400 m	33,11	29,84	$\frac{29,84}{33,11} = 90\%$
800 m	28,54	25,39	$\frac{25,39}{28,54} = 89\%$
1 500 m	25,46	23,08	$\frac{23,08}{25,46} = 91\%$
5 000 m	23,14	20,44	$\frac{20,44}{23,14} = 88\%$
10 000 m	22,21	20,05	$\frac{20,06}{22,21} = 92\%$
Marathon	20,01	17,69	$\frac{17,69}{20,01} = 88\%$

The average speed of the women's record is approximately 90% of the average speed of the men's record. This may be because men – on average – have more muscle on their bodies than women. The average speed of the men's record is often similar to the average speed of the women's record in the preceding events (for example, the average speed of the men's 400 m and the women's 200 m is approximately 33 km/h, the average speed of the men's 1 500 m and women's 800 m is about 25 km/h).

2.7 **Investigation:** Plan and budget for a holiday trip

Learner's Book page 29

Answers will differ.

Revise and consolidate

Learner's Book page 31

1. a. 60 ℓ = 15,85 gallons

b. Average car's fuel economy: 10 km/ℓ

Capacity of petrol tank: 60 ℓ

60 ℓ × 10 km/ℓ = 600 km

c. Distance on one tank of petrol = 600 km

Distance required = 400 miles

= 643,72 km

643,72 km > 600 km

Mrs Khumalo will not have enough petrol and will have to fill up.

d. Cost in SA: R13/litre
$/R exchange rate: R8,20 for $1

Cost in USA:
$3,80 per gallon
= R31,16 per gallon
= R31,16 per 3,785 ℓ
= R8,23 per litre

So, petrol in the USA is cheaper.

2. a. 3 h 18 min. 7 s: 11 887 s

b. 8 300 min.: approximately 5 days 18 hours

c. 1 461 days: $\frac{2}{5}$ decade

d. 44 460 min.: 31 days

e. 10:21:2,5: 10 h 21 min. $2\frac{1}{2}$ s

f. 1 min. 34,56 s: 1:34,56

g. 2 days 16 h 44 s: 2:16:0:44

h. 9 years: 7 888 hours

i. about 1,02 days: 24 h 30 min.

j. 144 h: 6:0:0:0

3. a. Tuesdays and Thursdays

b. Johannesburg to Cape Town
= 10:30 (day 1) to 12:40 (day 2)
= 01:30 + 12:00 + 12:40
= 13:30 + 12:40 (13 + 12 = 25 h and
= 26:10 h 30 + 40 = 70 min.)

The journey takes 26 hours and 10 minutes.

Cape Town to Johannesburg
= 12:30 (day 1) to 15:18 (day 2)
= 11:30 + 15:18
= 26:48

The journey takes 26 hours and 48 minutes.

c. The train stops for five minutes at each station.

d. No.

e. R580 + R580 = R1 160

f. Passengers should check departure and arrival times a day or two before the journey, and again on the day of departure.

4. a. Answers may differ.

b. Working hours on Mondays:

Start time	08:00
End time	12:30
Duration	4:30

To make five deliveries:
25 km × 2 trips (there and back) × 5 customers at 50 km/h
He can make one return trip per hour.

About five hours are required for deliveries. He only has four and a half hours and so his working day will have to be lengthened.

Working hours on Wednesdays:

Start time	8:00
End time	12:30
Duration	4:30

25 km × 2 trips (there and back) × 7 customers at 50 km/h

He can make one return trip per hour.
About 7 hours are required for deliveries. His working day will again have to be lengthened.

Working hours on Saturdays:

Start time	9:00
End time	12:00
Duration	3:00

25 km × 2 trips (there and back) × 8 customers at 50 km/h
He can make one return trip per hour.

So, 8 hours are required and he has only 3 hours available. They will have to lengthen the driver's working day or find another solution.

Unit 3
Financial documents at home and at work

Learner's Book pages 34–65

Teaching tips

- In Grade 10 and Grade 11, learners were introduced to the financial documents they need to understand and work with in this course. To ensure that they can apply this knowledge to a wide range of relevant contexts in their lives, collect documents that cover all the types listed in the Learner's Book, and extend the activities given to cover documents in your collection.
- The terminology in financial documents should be familiar to all learners. They will need to practise using these terms in verbal explanations and written work to become competent at recognising their meanings in all contexts. The glossary activity is a way for learners to use their own understanding to express the meanings of the terms – you can use this activity as baseline assessment of terms and concepts that are fully understood or terms may need to be revised in more detail while teaching this unit.
- Learners need to understand how financial documents are used in practical situations and be able to solve problems such as misunderstood contract agreements and late payments. Relate the examples given in the Learner's Book to similar situations that may have been reported in local newspapers (community newspapers often report problems that consumers have experienced with payments, contracts and so on), and invite learners to report experiences that they or their families have had with such situations.
- Understanding how to analyse a contract before signing it is an important consumer skill that all learners should develop. Banks, cellphone service providers, property managers and other organisations that issue contracts will generally not make blank contracts available for learners to study. To help your learners understand the terminology used in contracts, try to obtain a few examples of contracts that are commonly used in this context. Examples include rental agreements for flats or houses and cellphone contracts. Delete the personal details of contract holders before showing copies to the class. The main focus should be on the responsibilities that a person agrees to when signing a contract (such as paying a monthly amount), and the penalties for not doing so.

- The focus of the section on income tax in this unit is understanding the terminology and the concepts. Learners will analyse the practical process of calculating tax and completing tax returns in detail in Term 3.

Solutions

3.1 **Revise** different financial documents

Learner's Book page 34

Answers will differ.

3.2 **Revise** what you know about financial documents

Learner's Book page 38

1. **a.** A: current account statement
B: credit card statement
C: 32-day notice deposit statement

b. The current account and credit card statements record expenditure.

c. The statements for the current account (a deposit of R2 400) and the 32-day notice deposit (interest capitalised) show income.

d. Current account statement: 2 September to 1 October 2012
Credit card statement: 24 May to 24 June 2010
32-day notice deposit statement: 1 October to 31 December 2009

e. According to the credit card statement, the account holder owes R19 050,06. The minimum payment due is R952,49.

f. The credit card statement shows a debit balance interest rate of 18,50%.
The 32-day notice deposit statement shows an interest rate of 3,75%.

g. Current account: credit balance of R85 883,14
Credit card: a debt balance of R19 050,06
32-day notice deposit: credit balance of R6 331,18

2. **a.** The document is a payslip.

b. Gross salary plus commission: R30 000 + R2 000 = R32 000

c. Net pay equals gross pay minus total deductions. Total deductions consist of pension, PAYE, tax, UIF contribution and medical aid.

d. No, the employee's net pay each month will depend on the commission paid.

3.3 **Practise** choosing documents needed in different situations

Learner's Book page 45

1. To open a savings account and apply for a credit card you will need:
- proof of identification (for example, a green barcoded ID book)
- proof of address (for example, a utilities bill)
- proof of earnings (last three months' salary slips)

2. To open a current account at the same bank:
- proof of address
- proof of identification.

3. Zanele can take the faulty computer, the original receipt, her ID book, and the warranty document if there was one to the customer services department of the supermarket chain's Kimberly branch. The computer is still under warranty.

4. Achmat must show the faulty television set, the original receipt (cash slip), both warranty documents (particularly the one for the extended cover) and his ID to the shop.
5. An adult member of the family can take the accounts for the last few months (including the one that is very high) to the municipality to check if it is correct and to request that the amount be corrected if it is not correct.
6. Nandi could ask to see the owner or manager. She must state that the price label did not state that it cost R45 per slice and that when she placed the order, she was not told that the cake would cost R240. Nandi is not under obligation to purchase the cake. In future, Nandi should confirm the price of an item. If she were to purchase another cake, she could ask the counter assistant if the price is for the whole cake.
7. Jeremy must confirm his FICA status by taking proof of identification (such as a green, barcoded ID book) and proof of address, such as a recent utilities bill to the bank.
8. Pieter must RICA the phone to unlock it. To do this, he must take proof of identification (his green barcoded ID book), proof of residence (a recent utilities bill) and the cellphone to a cellphone shop (such as the local branch of his network provider). A shop assistant will use Pieter's documents to register him for RICA.

3.4 **Practise** reading and interpreting terms and conditions

Learner's Book page 51

1. **a.** Yes, a buyer can apply for finance by telephone or online. He or she does not need to go to a branch of the bank.

   b. The required documents for a SA citizen are:
   - An SA green barcoded ID book
   - Driver's licence
   - Proof of residence (for example, a utility bill)
   - Latest payslip or three month's bank statement if the applicant is not an FNB client
   - If the applicant earns commission, six months' pay slips and bank statements are required.

   Non-resident applicants need to show their:
   - passport
   - work permit
   - international driver's license
   - latest payslip
   - proof of residence
   - contract of employment.

   c. Yes, you can apply for the loan if you only earn commission and do not earn a basic wage or salary. You have to supply 6 months of payslips and bank statements.

   d. No, you cannot apply for a loan if you are unemployed.

   e. Non-SA citizens can apply for a loan.

   f. Costs are:

Inspection fee	R513
Facilitation fee	R2 100
Agent service fee	R820
Total	R3 433

g. The bank will investigate the document history of the car to ensure it can be title-cleared. The bank will arrange a vehicle inspection. The bank will review the inspection and HPI report to ensure the vehicle has not been rebuilt, is roadworthy, and the condition of the vehicle complies with FNB's quality requirements.

h. You must produce the original roadworthy certificate and original NATIS registration.

i. Yes, there are terms and conditions not listed in the brochure.

2. a. The letter states the minimum repayment required on Standard Bank credit was reduced from 5% to 3% of the balance owing.

b. If a person owed R1 000 on their credit card and only paid the minimum amount, they would now only have to pay R30 (3% of the balance) instead of R50 (5% of the balance) at the end of the month.

c. The bank made the change because of the current economic climate. Customers can repay less on their credit cards and not get into arrears.

d. An APO is an automatic payment order.

e. Clients can specify whether the APO pays:
- the full amount for the month
- the minimum amount for the month
- a fixed amount (provided it is greater than the minimum amount).

f. The cardholder has an outstanding balance of R19 050,06. If the cardholder specifies the APO to be for the full amount, then the entire R19 050,06 will be transferred from the nominated account in payment of the balance on the credit card.

If the accountholder specifies the minimum amount then the minimum amount specified on the statement, for example, R952,49, will be transferred from the nominated account to the credit card account.

If the accountholder specifies a fixed amount, such as R2 000, then the APO will transfer the R2 000 from the nominated account in payment. In this case, the specified amount is greater than the minimum amount. However, if it is less the APO will transfer the minimum amount to the credit card account

g. If you keep additional funds in a credit card, you can usually earn more interest on the amount than in a current account. You can also purchase an item on your credit card that is more than your credit limit. For example, if you wanted to purchase a R7 000 aeroplane ticket but only had available credit of R5 000 on your credit card you would need to put an additional R2 000 in your credit card account before you buy the ticket.

h. If the client's repayments were smaller, the client would take longer to repay the amount owing, and will have to pay more interest to the bank. Therefore, the bank will benefit from receiving more income from the interest charged on credit card balances.

3. a. You can borrow between R1 000 and R140 000.

b. An interest rate of 21% was used in the calculations. (However, the payments in the table also include a monthly service fee of R57 and an initiation fee of R1 140.)

c. No, you would pay a higher interest rate, depending on the amount and duration of the loan. For example, if you borrowed R1 000 over 12 months, the effective interest rate would be 99%. If you borrowed R20 000 over 12 months, the effective interest rate would be 22%.

d. You would have to pay a monthly service fee of R57 and a once-off initiation fee of R1 140.

e. The interest rate charged on your loan would be determined by your risk profile and may vary from the rate illustrated in the table. Fees were current at 1 August 2010 and were subject to change. You would need to be formally employed and earning R1 000 or more to apply for the loan. Loan applications were subject to credit approval.

f. No, other terms and conditions not specified on the brochure also apply.

g. It does not say who the bank is and how to contact them.

h. A more detailed table with a breakdown of costs and the effective interest rate should be involved.

4. Mahlophe needs to show his financial records and the duplicates of the invoices and receipts he issued during the tax year to prove his income was below the threshold amount for paying income tax. Masophe should also take copies of his bank statement over the tax year as additional proof that his income was below the threshold amount.

5. If Ragmat keeps a logbook of all the deliveries she has made (recording the date and distance travelled) she should use this to claim. She should also use all the petrol slips, and the invoices/receipts for servicing and repairs to the car.

3.5 **Assignment:** Finding information in the Pocket Tax Guide

Learner's Book page 64

(All information is taken from the 2012 tax year SARS Pocket Tax guide.)

1. There are six income tax brackets for individuals and special trusts:
- 0–160 000
- 160 001–250 000
- 250 001–346 000
- 346 001–484 000
- 484 001–617 000
- 617 001 and above.

2. People in the lowest bracket earn R160 000 or less per year and pay income tax of 18% on their taxable income.

People in the highest bracket earn R617 001 or more per year and pay R178 940 plus 40% of the taxable income over R617 000.

3. Taxpayers who are over 75 years of age have a rebate of R19 960. (They are entitled to the primary, secondary and tertiary tax rebates.)

4. A taxpayer who is 68 years old and earns R87 400 in the tax year, is entitled to the first and secondary rebates and will pay:
18% × R87 400 – (11 440 + 6 390)
= R15 732 – R17 830
= R2 098
∴ The taxpayer will not pay income tax.

5. Any person who earns income other than remuneration or an allowance or advance payable by the person's principal must pay provisional tax.

6. The following people are except from paying provisional tax:
- individuals below the age of 65 who do not run a business and whose taxable income does not exceed the tax threshold for the tax year or whose taxable income from interest, dividends and rental is R20 000 or less for a tax year

- individuals aged 65 and older whose taxable income for a tax year consists exclusively of remuneration, interest, dividends or rent from letting fixed property, and is R120 000 or less.

7. Interest earned by natural persons under 65 years of age up to R22 800 per year is not taxed.

Interest earned by persons 65 years of age and older up to R33 000 per year is exempt from taxation.

Foreign interest and dividends up to R3 700 is exempt.

Interest earned by non-residents who are absent from SA for 183 days or more per annum and who do not carry out business in SA are exempt.

8. Yes, taxpayers under 65 years of age (such as the 37-year old) may claim all qualifying medical expenses for her disabled son.

9. The 51-year old may only claim an exemption of R230 per month on his medical aid payments. This equals R2 760 per year.

10. A taxpayer who receives a subsistence allowance is allowed R303 per day for meals and incidental costs or R93 per day for incidental costs only if the accommodation is in South Africa. If the subsistence allowance relates to accommodation outside the country a specific amount per country is exampt from taxation. The SARS website contains the amounts for each country.

11. If the taxpayer receives a loan at an interest rate lower than the official interest rate, the difference between the official rate and the actual amount of interest charged is included in the gross income.

12. **a.** Taxpayers must pay 8,5% interest if they pay income tax for the year after the end of the year.

b. Taxpayers will receive 4,5% interest on the overpayment from SARS.

c. Note: SARS uses the repo rate as the official rate of interest.

At 28 November 2012 the repo rate was 5%. The 4%-loan is therefore 1% less than the official rate at this date.

13. The taxpayer should read the following sections:
Income tax: Individuals and trusts
Individuals and special trusts
Tax rebates
Tax thresholds
Medical aid and disability expenses

14. Individuals and special trusts
Tax rebates
Subsistence allowances and advances
Pension fund contributions
Medical and disability advances
Travelling allowance
Residential accommodation

Unit 4
Tarrifs

Learner's Book pages 66–88

Teaching tips

- In Grade 10 and Grade 11, learners developed the skills to read and interpret tariffs for municipal, transport, telephone and bank services, and to use calculations and graphs to choose a suitable tariff options in different situations. The activities in this unit build on these core skills, with more complex tariff situations and with tariff information that learners must research.
- Tariffs for many public services are available via internet websites; for example, websites for municipalities, Eskom, Telkom and cellphone networks. You can apply the structure of the activities in the Learner's Book to updated tariff information that learners research on the internet, to give them more practice in tariff calculations.
- Remind learners that when comparing tariffs for different services, they should analyse other reasons a person might have for choosing a particular service even if it does not have the most inexpensive tariff. For example, a cellphone with a higher call tariff may have more features on the phone that comes with the package, or a train season ticket may cost more than a bus season ticket, but the passenger would not have to walk as far to and from the train station as to and from the bus terminus.
- Link the tariff calculation activities in this unit to work that learners do with financial documents in Unit 3 this term (reading tariffs set out in documents), and also to the calculation of tariff costs for use in income and expenditure statements, budgets, profit-and-loss analyses, bank accounts, travel costs, and so on in later units.

Solutions

4.1 **Practise** doing tariff calculations and comparisons

Learner's Book page 66

1. **a.** A City of Cape Town electricity account
B Telkom telephone account
C City of Cape Town municipal rates account

b. A Electricity account: 20/12/2012–19/01/2013
B Telephone account: 17/05/2013–16/06/2013
C Rates account: property rates: 21/12/2010–19/01/2011
water: 14/12/2010–17/01/2011
refuse: 21/12/2010–19/01/2011
sewerage: 14/12/2010–17/01/2011

c. Electricity account: KwH used
Telephone account: call units
Rates account:
Property rates: value of the house
water: water consumption (kilolitres)
refuse: number of bins and removals
sewerage: water consumption (kilolitres)

d. A Not shown – shown overleaf on account
B Not shown – shown overleaf on account
C Tariffs (and applicable rebates) shown for property rates, water, refuse and sewerage

e. property rates: single tariff
water: stepped tariff
refuse: single tariff
sewerage: stepped tariff

f. A Electricity account

Previous account balance	R176,13
Less payment	– R176,13
	0,00
Current amount	R169,28
Balance	R169,28

B Telkom account

Previous account balance	R628,29
Less payment	– R628,29
Current invoice	R642,01
Rental	R454,96
Usage	R34,92
Less discount	– R16,72
Subtotal	R563,12
VAT (14%)	R78,85
	R642,01

C Rates and services

Property rates

1 475 500 × 0,0053 ÷ 365 × 30 days	R642,75
less 15 000 × 0,0053 ÷ 365 × 30 days	– R6,53
less 185 000 × 0,0053 ÷ 365 × 30 days	– R80,59
	R555,53

Water

1	6,9040 ℓ @ R0,00/ℓ	R0,00
2	5,1780 kl @ R3,99 kl	R20,66
3	10,9320 kl @ R8,51 kl	R93,03
4	13,9860 kl @ R12,61 kl	R176,36
	37,0000 kl	R290,05

Refuse

1 × 240 ℓ bin × 1 removal @ R75,44	R75,44

Sewerage

1	4,8330 kl @ R0,00/ℓ	R0,00
2	3,6250 kl @ R4,6700/kl	R16,93
3	7,6520 kl @ R9,9400/kl	R76,06
4	9,7900 kl @ R10,8700/kl	R106,42
	25,9000 kl	R199,41

2.

Contract options	Basic tariff per month	Number of off-peak minutes per month	Tariff per off-peak minute	Data bundle included	Extra features included	Monthly tariff includes VAT
Sony Ericsson Xperia Neo	R169	120 minutes per month for 24 months	Not given	100 MB data per month for 3 months	HD Video Recoarding (720 pixels) Built-in HDMI 8.1 megapixel camera	Included
Nokia N8 Smartphone	R189	120 minutes per month for 24 months	Not given	100 MB data per month for 3 months	3.5 G Full touch smartphone 12 megapixel camera HD video recording GPS with free lifetime voice-guided navigation	Included
Sony Ericsson Xperia Play	R199	120 minutes per month for 24 months	Not given	100 MB data per month for 3 months	Google Mobile Service Console-like gaming Super-fast graphics	Included
Blackberry Curve 9360 Smartphone	R229	120 minutes per month for 24 months	Not given	Includes Blacberry Internet Service (BIS)	New Blackberry & OS Display HVGA + (480 × 360) 246 DPI Dimensions: 60 × 109 × 11 mm	Included

3. Answers will differ. Examples are given below.

a. The Sony Ericsson Xperia Neo is the cheapest of the four smartphones (at R169,00) for the student.

b. The Sony Ericsson Xperia Play – the musician can download music and play games while on tour using the smartphone's console-like gaming feature.

c. The Blackberry Curve 9360 – the teenager can use the Blackberry Internet Service to surf the web and the Blackberry Messenger to chat with friends.

d. The Nokia N8 Smartphone has the best quality camera (12 megapixel) with HD video recording. The journalist can use the phone to record interviews, take photographs and even record videos. The journalist can also use the cellphone's GPS and voice-guided navigation to get to interviews and events without getting lost.

4. **a.** Monthly fee: R55,00
Transactions not included: 35 – 10 = 25
Fee per transaction: R6,00
Transaction fees: R150
Total average monthly fee: R205

b. Monthly fee: R85,00
Transactions not included: 28 – 15 = 13
Fee per transaction: R5,50
Transaction fees: R71,50
Total average monthly fee: R156,50

c. Monthly fee: R85,00
Transactions not included: 25 – 15 = 10
Fee per transaction: R5,50
Transaction fees: R55,00
Total average monthly fees: R140,00

d. Islamic Cheque Option 1

Monthly fee: R110,00
Transactions not included: 40 – 25 = 15
Fee per transaction: R10,00
Transaction fees: R150,00
Total average monthly fees: R260,00

Islamic Cheque Option 2

Monthly fees: R150,00
Transactions not included: 40 – 35 = 5
Fee per transaction: R10,00
Transaction fees: R50,00
Total average monthly fees: R200,00
The Islamic Cheque Option 2 account would be better for the Muslim customer.

4.2 **Practise** calculating costs of using different municipal services

Learner's Book page 72

1. a. Hire of stadium (12:00–18:00): R350,00
18 matches per season
R350,00 × 18 = R6 300

b. i. Cost of use of stadium
There is a minimum cost of R2 650 to use the stadium.

ii. Deposits and electricity

Deposit	R6 580,00
Kitchen appliances deposit	R475,00
Key deposit	R126,00
	R7 181,00

Electricity
R40,00 p/h @ 11 hours = R440,00
R7 181 + R440 = R7 621

iii. Crockery
2 500 people are expected to attend the event for some part of the day.
Meals provided: lunch, supper, afternoon and morning drinks

Lunch and supper (example)
2 meals × 2 items of crockery × 1 250 people × R0,33 per item of dirty crockery = R1 650,00

Afternoon and morning drinks (example)
2 drinks × 1 item of crockery × R1 250 people × R0,33 per item of dirty crockery = R825
R1 650 + R825 = R2 475

c. Use of stadium
Two full days use and one evening use (2 hours)
2 × R870 + R500 = R2 240

Electronic timing system
R790 per day × 2 = R1 580

Deposit on athletics equipment	R790,00
Deposit for stadium use	R790,00
Key deposit	R126,00

Total: R2 240 + R1 580 + R790 + R790 + R126,00 = R5 526,00

2. Rehearsal

Use of hall (amateur/educational rate)	R765,00
Dress rehearsals (twice)	
Use of hall for dress rehearsal R383 × 2	R766,00
Lighting technician R37,50/h × 8 h	R300,00
Sound operator R37,50/h × 8 h	R300,00
Sound system rental (per day) (50%)	R113,75
Smoke machine rental (per day) (50%)	R47,50
Slide projector (per day) (50%)	R27,50
	R1 554,75
Performance	
Use of hall (amateur/educational rate)	R765,00
Lighting technician R37,50/h × 4 h	R150,00
Sound operator R37,50/h × 4 h	R150,00
Sound system (per day)	R227,50
Slide projector (per day)	R55,00
Smoke machine (per occasion)	R95,00
Use of foyer for exhibition of photographs	R195,00
	R1 637,00
Total costs for using the theatre	
Deposit (refundable)	R960,00
R765,00 + R1 554,75 + R1 637,00 + R960,00	R4 917,25

3. a. Daily rate
Pensioner daily rate: R7,00
Average usage per month:
Four times per week × 4 weeks = 16
Total cost = R7,00 × 16 = R112,00
Monthly tariff – pensioners: R185,00

It is cheaper for the pensioner to pay the daily entrance tariff.

b. Adult seasonal rate: R246,00
Daily rate: R8,00
R246 ÷ 8 = R30,75

If the adult uses the pool 31 times or more, then the season tariff is more economical than the daily rate.

c.

Grade	Number of learners	Day	Rate
4	48	Monday	R245,00
5	62	Tuesday	R373,00
6	36	Wednesday	R245,00
7	53	Thursday	R373,00
Total			**R1 236,00**

10 weeks of lessons in Term 1 (assuming no public holidays):
Total cost for Term 1: R1 236 × 10 = R12 360,00

4.3 Investigation: Look at tariffs in your municipality

Learner's Book page 76

Answers will differ.

1. Trips on route per week: 4 times a week × 2 = 8

Class II (medium heavy vehicle)
Toll costs (mainline tolls)
R20,50 + R9,50 + R102,00 + R78,00 + R74,00
= R284,00

8 trips × R284,00 = R2 272,00

Class III (large heavy vehicle)
Trips on route per week 1 × 2 = 2
R24,00 + R11,50 + R113,00 + R104,00 + R120,00
= R372,50

2 trips × R372,50 = R745,00

Total toll fees
R2 272,00 + R745 = R3 017,00

2. Using a Class I vehicle
She passes through the De Hoek and Wilge, Tugela, Mooi River (mainline) and Mariannhill toll.

R34,00 + R47,00 + R50,00 + R35,00 + R8,00
= R174,00

She travels on a round trip (Johannesburg to Durban and back to Johannesburg)
∴ R174,00 × 2 = R348,00

She travels to Durban 24 times a year:
R348,00 × 24 = R8 352

3. Toll road costs

Pretoria–Lobatse

Toll	**Class II**	**Class III**	**Class IV**
Quagga	R5,50	R8,00	R11,00
Pelindaba	R7,50	R11,00	R14,00
Doornpoort	R25,00	R29,00	R35,00
Brits	R35,00	R39,00	R46,00
Marikana	R36,00	R41,00	R49,00
Swartruggens	R177,00	R215,00	R253,00
Toll fees per trip	R286,00	R343,00	R408,00
Trips	2 × 56 = 112	2 × 54 = 108	2 × 27 = 54
Subtotal	R32 032	R37 044	R22 032
Route total			R91 108

Cape Town–Johannesburg

Toll	**Class II**	**Class III**	**Class IV**
Grassmere (mainline)	R41,00	R48,00	R63,00
Vaal	R85,00	R103,00	R137,00
Verkeerdevlei	R78,00	R117,00	R164,00
Huguenot	R75,00	R117,00	R190,00
Toll fee per trip	R279,00	R385,00	R554,00
Trips	16 × 2 = 32	40 × 2 = 80	47 × 2 = 94
Subtotal	R8 928,00	R30 800,00	R52 076
Route total			R91 804,00

Pretoria–Maputo

Toll	Class II	Class III	Class IV
Diamond Hill (mainline)	–	R67,00	R111,00
Middelburg	–	R140,00	R183,00
Machado	–	R256,00	R366,00
Nkomazi	–	R141,00	R203,00
Moamba			
Toll fees per trip		R604,00	R863,00
Trips	0	30 × 2 = 60	38 × 2 = 76
Subtotal	–	R36 240	R65 588
Route total			R101 828,00

Durban–Empangeni

Toll	Class II	Class III	Class IV
Tongaat (mainline)	R16,00	R21,00	R31,00
Mvoti	R26,00	R35,00	R52,00
Mtunzini	R61,00	R72,00	R108,00
Toll fees per trip	R103,00	R128,00	R191,00
Trips	2 × 126 = 252	2 × 102 = 204	2 × 83 = 166
Subtotal	R25 956,00	R26 112,00	R31 706,00
Route total			R83 774,00

Route	Cost
Cape Town–Johannesburg	91 804,00
Pretoria–Lobatse	91 108,00
Pretoria–Maputo	101 828,00
Durban–Empangeni	83 774,00
	368 514,00

4. a. February

January total: R1 080,00
Discount rate: 50%
February discount = January total × discount rate
= R1 080 × 50%
= R540,00
So, February cost: R1 080 – R540 = R540

b. March

February total: R540,00
Discount rate: 15,0%
March discount = February total × discount rate
= R540,00 × 15%
= R81,00
March cost: R540,00 – R81,00 = R459,00

c. April

March total: R459,00
Dicount rate: 15%
April discount = March total × discount rate
= R459,00 × 15%
= R68,85
April cost: R459,00 – R68,85 = R390,15

Learner's Book page 84

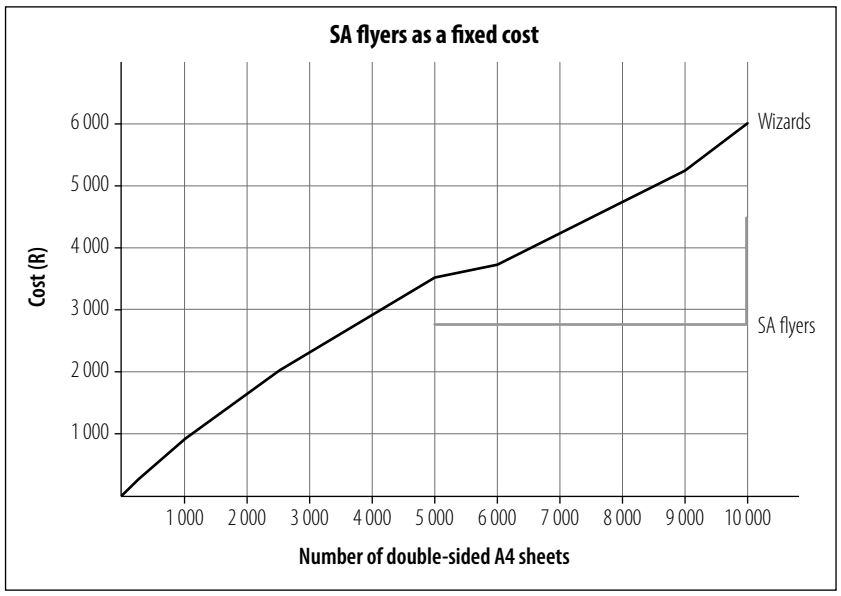
1. **a.** Graphs will differ.

b. Examples:
At 5 kl of consumption, City 2 is the best (cheapest).
At 15 kl of consumption, City 1 is the best.
At 30 kl of consumption, City 1 is the cheapest.

c. The cost is approximately for cities 2 and 3 between 6 kl and 7 kl per month.

2. For example, the company wants double-sided A4 flyers on 80 gsm white bond paper.

a.



b. There is no break-even point.

c. **i.** Wizards
8 000 A4 sheets: R5 + (7 999 A4 sheets × R0,60)
= R4 804,00
SA flyers
8 000 A4 sheets R2 800
At cost per 5 000 A4 sheets
So, it is cheaper to use SA flyers.

ii. Wizards
R5 + (4 499 A4 sheets at R0,70) = R3 504,30
SA flyers
5 000 A4 sheets at R2 800
(At cost per 5 000 A4 sheets)
So, it is cheaper to use SA flyers.

3. Answers will differ.

Unit 5
Income-and-expenditure statements and budgets

Learner's Book pages 89–111

Teaching tips

- The work that learners did in Grade 10 and Grade 11 with income-and-expenditure statements and budgets is extended in Grade 12 from household and small business statements and budgets to those that are used in bigger organisations (from businesses to national governments). Learners must be able to read and do simple calculations with big money values (millions and billions of rand) as set out in these statements.
- They should also learn to interpret what an organisation's income and expenditure shows about the kinds of activity that are prioritised in the organisation. For example, if a charity spends more money on its staff salaries than on activities designed to help the people it aims to serve, this would indicate that the organisation's expenditure pattern does not reflect its charitable aims and vision.
- As in other units, learners must demonstrate that they can understand and use the terminology found in income-and-expenditure statements and budgets. The first activity in the unit is an opportunity for them to revise this knowledge. It also allows learners to practise an important type of calculation they will use when analysing income-and-expenditure statements and budgets – calculating percentage increases and decreases.
- In Grade 12, learners are expected to do research to identify items that would be listed in income-and-expenditure statements and budgets for individuals, households and small businesses, and their costs, as well as working with the examples in the Learner's Book. Some activities are based on learners' research for this purpose; you can adapt these to suit the local context in which learners live by, for example, asking them to prepare an income-and-expenditure statement for a local vendor or service provider who is willing to share information with the class, instead of doing the investigation of the mealie vendor's costs and income in the Learner's Book.
- Some activities in this unit are also designed to help learners plan for real-life situations once they leave school. Help the learners find information and share ideas about the real opportunities, expenses and other factors that they will encounter after Grade 12, and discuss with them how they will plan for these situations.
- Use the internet to obtain up-to-date budgets for local, provincial and national government, to add to the resources in the Learner's Book. For the investigation in which learners analyse the local municipal budget, try to arrange for an official to visit the class and discuss the questions learners are asked to investigate – this would be more efficient than having many small groups of learners trying to set up separate appointments with the municipality to obtain the information they need.

Solutions

5.1 Assignment: Practise interpreting a business income-and-expenditure statement

Learner's Book page 91

(All amounts are given in thousands of rand (R'000).)

1. a. $\frac{\text{R3 059 648}}{\text{R73 810 469}} = 4{,}15\% \approx 4\%$

b. i. R3 059 648 > R3 002 589
Furniture sales in 2011 was higher than in 2010.
R3 059 648 000 – R3 002 589 000 = R57 059 000

ii. $\frac{57\ 059}{3\ 002\ 589} \times 100 = 1{,}9\%$

2. a.

Supermarkets in RSA	R58 726 485
Supermarkets outside RSA	R7 316 698
	R66 043 183

b. i. Supermarkets in RSA
$\frac{\text{R58 726 485}}{\text{R66 043 183}} = 88{,}9\% \approx 89\%$

ii. Supermarkets outside RSA
$\frac{\text{R7 316 698}}{\text{R66 043 183}} = 11{,}1\% \approx 11\%$

3. Total supermarket income for 2010
R54 733 352 + R7 163 977 = R61 897 329

$$\frac{\text{income 2011} - \text{income 2010}}{\text{income 2010}}$$

$$\frac{\text{R66 043 183} - \text{R61 897 329}}{\text{R61 897 329}} = \frac{\text{R4 145 854}}{\text{R61 897 329}}$$

$$= 6{,}7\% \approx 7\%$$

Supermarket income (for RSA and non-RSA stores) increased by 7% for 2010 and 2011.

4. a. Total expenditure on salaries and wages = R5 514 459 (R'000s)
= R5 514 459 000

b. $\frac{\text{R5 514 459} - \text{R4 961 705}}{\text{R4 961 705}} = 11{,}1\% \approx 11\%$

5. a. 2011

$$\frac{\text{R5 996}}{\text{R5 524 683}}$$

$$= 0{,}109\%$$

b. 2011

$$\frac{\text{post-retirement medical benefits}}{\text{total employee benefits}} = \frac{\text{R3 760}}{\text{R6 089 252}}$$

$$= 0{,}062\%$$

6. a. R26 489 (R'000s)
= R26 489 000

b. R26 489 < R28 899
So, the auditors' renumeration decreased from 2010 to 2011.
$\frac{\text{R26 489} - \text{R28 899}}{\text{R28 899}} = -8{,}34\% \approx -8\%$

c. R164 725 (R'000s)
= R164 725 000

d. $\frac{\text{R164 725} - \text{R214 000}}{\text{R214 000}} = -23{,}03\% \approx 23\%$

Outside service fees decreased by 23% from 2010 to 2011.

e. Fees paid for outside services decreased from 2010 to 2011 because administrative fees decreased by R15 941 million and technical fees decreased by R33,705 million while secretarial fees only increased by R0,371 million.

7. a. Employee benefits: R6 089 252
Total income: R73 810 469
$\frac{\text{R6 089 252}}{\text{R73 810 469}} = 8{,}25\% \approx 8\%$

b. Operational costs

Auditors' remuneration	R26 489
Fees paid for outside services	R164 725
Total	R191 214

$\frac{\text{R191 214}}{\text{R73 810 469}} = 0{,}26\%$

8. a. Employee benefits: R5 524 683
Total income: R68 768 621
$\frac{\text{R5 524 683}}{\text{R68 768 621}} = 8{,}03\% \approx 8\%$

b. Operational costs

Auditors' remuneration	R28 899
Fees paid for outside services	R214 000
Total	R242 899

$\frac{\text{R242 899}}{\text{R68 768 621}} = 0{,}35\%$

Employee benefits as a percentage of total income increased from 8,03% in 2010 to 8,25% in 2011.

Operating costs as a percentage of total income decreased from 0,35% in 2010 to 0,26% in 2011.

5.2 Assignment: Compile an income-and-expenditure statement for a mealie vendor's business

Learner's Book page 93

Answers will differ.

5.3 Assignment: Compile a personal income-and-expenditure statement and budget

Learner's Book page 93

Answers will differ.

5.4 Assignment: Practise reading and interpreting income-and-expenditure statements for an organisation

Learner's Book page 97

1. a. 2011 revenue (R millions) 581,1
2007 revenue (R millions) 223,3
581,1 – 223,3 = 357,8

b. $\frac{581{,}1 - 223{,}3}{223{,}3} = 160{,}23\% \approx 160\%$

c. Broadcast revenue was the main source of income in 2008.

$\frac{27{,}5 \text{ mm}}{47 \text{ mm}} \times 490{,}9 \approx \text{R}287{,}2$

d. $\frac{27{,}5 \text{ mm}}{52{,}5 \text{ mm}} = 52{,}38\% \approx 52\%$

e. Broadcast revenue

$\frac{27 \text{ mm}}{56 \text{ mm}} = 48{,}2\%$

Sponsorship revenue

$\frac{23 \text{ mm}}{56 \text{ mm}} = 41{,}1\%$

Broadcast revenue is a more important source of income in 2011 than sponsorship income. Broadcast income accounts for 48% of total income, while sponsorship accounts for 41%.

2. Learners discuss answers.

3. Learners discuss answers.

4. a. i. Main sources of income in 2010/11
Trusts: R13 865 000
Communications and resource development: R5 613 000
Bequests: R5 474 000

ii. Main sources of income in 2009/10
Communications and resource development: R5 019 000
Bequests: R4 882 000
Hospital: R2 527 000

b. i. 2010/2011

Trusts: $\frac{\text{R13 685}}{\text{R35 790}} = 38{,}7\% \approx 39\%$

Communications and resource development:

$\frac{\text{R5 613}}{\text{R35 790}} = 15{,}7\% \approx 16\%$

Bequests: $\frac{\text{R5 474}}{\text{R35 790}} = 15{,}3\% \approx 15\%$

ii. 2009/2010
Communications and resource development:

$\frac{\text{R5 019}}{\text{R19 201}} = 26{,}1\% \approx 26\%$

Bequests: $\frac{\text{R4 882}}{\text{R19 201}} = 25{,}4\% \approx 25\%$

Hospital: $\frac{\text{R2 527}}{\text{R19 201}} = 13{,}2\% \approx 13\%$

c. i. 2010/2011

Expense	Cost (R'000)
Boarding and adoptions	R2 653
Horse care unit	R868
Mobile clinics	R492
Wildlife	R336
Hospital	R4 712
Total	R9 061

$\frac{\text{R9 061}}{\text{R23 694}} = 38{,}2\% \approx 38\%$

ii. 2009/2010

Expense	Cost (R'000)
Boarding and adoptions	R2 550
Horse care unit	R750
Mobile clinics	R346
Wildlife	R304
Hospital	R4 683
Total	R8 633

$\frac{\text{R8 633}}{\text{R18 735}} = 46{,}1\% \approx 46\%$

d. Increase in total income 2010 to 2011

$\frac{\text{R35 790} - \text{R19 201}}{\text{R19 201}} = 86{,}4\% \approx 86\%$

Income increased by 86% from 2010 to 2011.

Increase in total expenses from 2010 to 2011

$\frac{\text{R23 694} - \text{R18 735}}{\text{R18 735}} = 26{,}5\% \approx 27\%$

Expenses increased by 27% from 2010 to 2011.

Therefore, income did not increase by the same percentage as the total expenditure from 2010 to 2011. Income increased at a higher rate (86%) compared to expenditure (which increased by 27%).

5.5 **Investigation:** Analyse an income-and-expenditure statement for a community organisation

Learner's Book page 101

Answers will differ.

5.6 **Practise** reading and interpreting government budget documents

Learner's Book page 109

Leaners compare and discuss answers.

1. a. The service charge for electricity is the biggest source of income.

$\frac{\text{R8 971 405}}{\text{R23 880 441}} = 37{,}6\%$ of total revenue

b. Property rates: R5 030 753 000

$\frac{\text{R5 030 753}}{\text{R23 880 441}} = 21{,}1\%$ of total revenue

c. Service charges (R'000)

Electricity	R8 971 405
Water	R2 085 289
Sanitation	R1 144 122
Refuse	R896 924
Other	R233 940
	R13 331 680

$\frac{\text{R13 331 680}}{\text{R23 880 441}} = 55{,}8\% \approx 56\%$

d. Employee-related costs: R7 690 260 000

e. Interest earned – outstanding debtors = R236 797 000

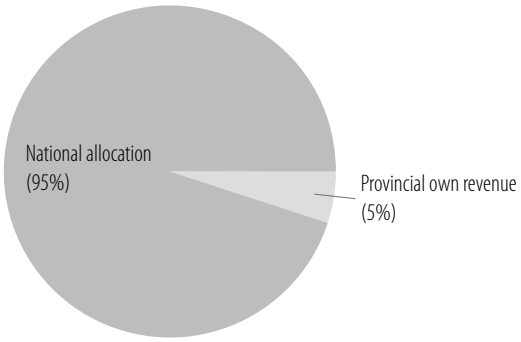
$\frac{\text{R236 797 000}}{\text{R23 880 441}} = 0{,}99\% \approx 1\%$

f. Projected income R23 880 441
Projected expenditure R24 341 212
–R460 771

There is a projected shortfall of R460 771 000 for the 2012 budget.

2. a. Revenue

b.



c. Comprehensive HIV and Aids grants: R1 278 billion

$$\frac{\text{R1,278 billion}}{\text{R13,728 billion}} = 9{,}31\% \approx 9\%$$

d.

Conditional grant	Percentage of total budget*
Integrated Housing & Human Settlements Grant	27,48
National Tertiary Services Grant	18,66
Other grants	12,97
Public Transport Operations Grant	10,90
Comprehensive HIV and Aids Grant	9,31
Provincial Infrastructure Grant	6,93
Hospital Revitalisation Grant	5,82
Health Professionals training and development	4,75
Gautrain	3,19

* Total budget is R13,728 billion.

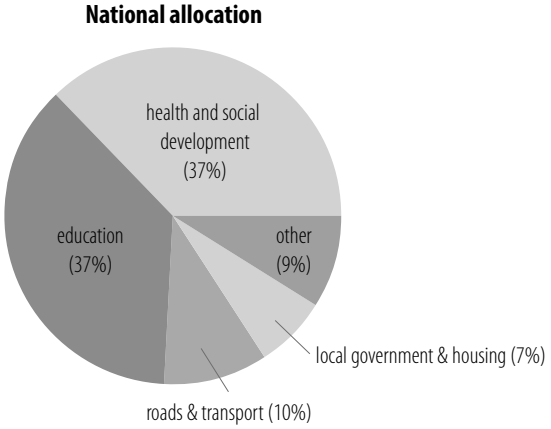
e. Vehicle licences (58% of the province's own revenue)

f. i. If fewer people owned cars, the province's own revenue would be reduced significantly. However, this would reduce the total net revenue for the province by 1% or 2%.

ii. If there were fewer casinos in Gauteng, this would reduce the province's own revenue. However, this would reduce the province's total net revenue by less than 1%

(The province's own revenue is 5% of total net revenue. 58% of 5% is 2,9% of the total budget. 21% of 5% is 1,05%.)

g.



h. Eduction : roads and transport
R22,468 billion : R6,179 billion
3,6397 : 1

The budget for education is 3,64 times bigger than the budget for roads and transport.

3. a.

Source	2011/2	2012/3	Change
Personal income tax	34,1%	34,6%	+0,5%
Excise duties	3,4%	3,5%	+0,1%
Corporate income tax	19,4%	20,3%	+0,9%
Customs duties	4,0%	4,4%	+0,4%
VAT	27,1%	25,4%	–1,7%
Fuel levies	5,0%	5,2%	+0,2%
Other	7,0%	6,7%	–0,3%

Alternatively, as amounts

Source	2011/2 Rm	2012/3 Rm	Change
Personal income tax	R257 500	R287 200	+R29 700
Excise duties	R25 700	R29 100	+R3 400
Corporate income tax	R146 500	R168 500	+R22 000
Customs duties	R30 200	R36 500	+R6 300
VAT	R204 600	R210 900	+R6 300
Fuel levies	R37 800	R43 200	+R5 400
Other	R52 900	R55 600	+R2 700

b. Personal income tax

c.

Department	2011 (R million)	2012 (R million)	Percentage change
Education	R172,713	R195,483	13,18
Health	R102,522	R113,796	11,00
Social protection	R139,113	R144,693	4,01
Housing and community amenities	R102,061	R107,482	5,31
Public order and safety	R84,050	R90,544	7,73
Defence	R33,958	R52,068	13,00
General public services	R51,325	R38,367	1,45
Economic affairs	R140,319	R134,571	–4,1

d. Note: Most the budgets for departments increase/decrease by 5%.

Agriculture, forestry and fisheries	15,8% increase
Environmental protection	58,3% increase
Economic affairs	6,1% increase
Fuel and energy	21,5% decrease
Transport	14% increase
Communication	21,9% decrease
Other general services	48,7% decrease
Executive and legislative & finance affairs	28,3% increase
State debt cost	16,7% increase
International relations and cooperation	29,2% increase

Defence	8,1% increase
Police	7,1% increase
Public order and safety	7,8% increase
Prisons	8,5% increase
Law courts	10,2% increase
Recreation and culture	34,4% increase
Local government and community development	9,6% increase
Water supply	20,5% decrease
Provincial hospitals	9,3% increase
Administration and other health services	8,8% increase
Central hospital services	67,61% increase
Health infrastructure	21,4% decrease
HIV/Aids and TB	18,8 increase
Health	8,3% increase
Social services	6,7% increase
Social protection	7,4% increase
Old age	7,4% increase
Child support	7,3% increase
Social security	19,5% increase
Disability grant	7,9% increase
Other grants	7,9% increase
Policy oversight	15% decrease
Provincial welfare	7% increase
Education	9,4% increase
Tertiary education	20,4% increase
FET and adult education	132,3% increase
Education administration	17,9% decrease
Contingency reserve	41,5% increase

e. 2010/11 consolidated total expenditure: 897 376
2011/12 consolidates total expenditure: 972 547

$$\frac{972\,547 - 897\,376}{897\,376} = 8{,}38\%$$

4. a. Budgeted expenditure for 2012 on all sections of education:
Education for 2012: R207,3 bn
Increase of 9,5% for 2013:
R207,3 bn + R19,69 bn
= R226,99 bn
≈ R227 bn
Basic education for 2012: R152,1 bn
Increase of 9,5% for 2013:
R152,1 bn + R14,45 bn
= R166,55 bn
Tertiary education for 2012: R31,3 bn
Increase of 9,5% for 2013:
R31,3 bn + R2,97 bn
= R34,27 bn
Vocational and continuing education training for 2012: R14,4 bn
Increase of 9,5% for 2013:
R14,4 bn + R1,37 bn
= R15,77 bn

Education administration for 2012: R9,6 bn
Increase of 9,5% for 2013:
9,6 bn + R0,91 bn
= R10,51 bn

Budgeted expenditure for 2012 on all sections of social protection:
Social protection for 2012: R157,9 bn
Provincial welfare services for 2012: R12,3 bn
Increase of 9,5% for 2013:
R12,3 bn + R0,52 bn
= R12,82 bn
Social security fund benefits for 2012: R29,4 bn
Decrease of 0,55% for 2013:
R29,4 bn – R0,16 bn
= R29,24 bn
Old age grants for 2012: R39,3 bn
Increase of 1,75% for 2013:
R39,3 bn + R0,69 bn
= R39,99 bn
Housing and community amenities for 2012: R120,1 bn
Decrease of 2,05% for 2013:
R120,1 bn – R2,46 bn
= R117,64 bn
Health for 2012: R121,9 bn
Increase of 3,45% for 2013:
R121,9 bn + R4,21 bn
= R126,11 bn

b. Total amount that the government had to budget for social services for 2013:

Education (all sections)	R227,00 bn
Social protection:	
Provincial welfare services	R12,82 bn
Social security fund benefits	R29,24 bn
Old age grants	R39,99 bn
Disability grants	R19,20 bn
Child support grants	R38,20 bn
Policy oversight and grant and benefits administration	R11,30 bn
Other grants	R8,20 bn
Housing and community amenities	R117,64 bn
Health (all sections)	R126,11 bn
Total	**R629,70 bn**

5. a. Percentage increase on budget for social services from 2012 to 2013:

$$\frac{\text{R629,70 bn} - \text{R615,7 bn}}{\text{R615,7 bn}} \times \frac{100}{1}$$

= R2,27%

Therefore, total budget amount for social services for 2014:
R629,7 bn + R2,27%
= R643,99 bn

b. Total budgeted amount for social services for 2015:
R643,99 bn + 2,27%
= R658,61 bn

6. a. 0,15% increase in service charges on:

Water: 0,15% of R2 085 289 000	R3 127 933,50
Sanitation: 0,15% of R1 144 122 000	R1 716 183,00
Refuse: 0,15% of R896 924 000	R1 345 386,00
Total	**R6 189 502,50**

The increases will not cover the cost of the new bus service.

b,c. Answers will differ.

Unit 6
Cost price, selling price and break-even analysis

Learner's Book pages 112–130

Teaching tips

- In Grade 11, learners were introduced to methods for calculating cost price and selling price, and doing a break-even analysis. This unit begins by revising the basic concepts and skills involved in this process, and it then applies them to more complex types of small business than learners dealt with in Grade 11. Learners are not expected to use algebraic calculations when doing break-even analyses, but rather to use the estimation and graph-reading skills they developed in Grade 10 and Grade 11.
- The case studies of small businesses given in the Learner's Book are set out in such a way that learners must discuss and identify the costs involved, before doing the actual calculations. This is an important part of the process of analysing costs for a business. Help learners to think about all the fixed costs and production costs involved in each case, as a way to develop their independent analytical skills.
- This process also involves doing research to find out what the real costs are of different items that a business needs to make its products or offer a service. Learners should investigate real businesses in their neighbourhood, or further afield, to find out what the current costs are in each case.
- In the calculations for setting selling prices, learners need to use their skills at calculating percentage increases and decreases. Make sure that all learners are completely comfortable with these types of calculations, using the skills reference section at the back of the Learner's Book as necessary.

Solutions

6.1 **Practise** identifying fixed costs and production costs

Learner's Book page 113

1. Wages: Production cost

Salaries: Usually a fixed cost (for example, for the manager) but could be a production cost (such as hairdressers' salaries)

Commission payments: Production costs

Rent: Fixed costs

Electricity/gas: Can be both. Electricity used for computers and lighting would be a fixed cost. Electricity used for manufacturing goods would be a production cost.

Telephone: Fixed cost

Water: Can be both: water used for producing goods or providing a service (such as washing hair for a hairdresser) is a production cost and water for tea, coffee, washing and toilets is a running/fixed cost.

Office stationery: Fixed cost/running cost

Computers: Fixed cost/running cost

Office cleaning materials: Fixed cost/running cost

Bank charges: Fixed cost/running cost

Loan interest: Fixed cost/running cost

Employee taxes: Fixed cost/running cost

UIF contributions for staff: Fixed cost/running cost

Materials to make goods: Production cost

Equipment needed to make goods: Production cost

Equipment maintenance and repair: Fixed cost/running cost

Advertising: Fixed cost/running cost

Petrol, license fees, repairs and insurance used by the business: Fixed cost/running cost

2. Answers will differ.

6.2 **Investigation part 1:** Calculating costs of production and total cost price

Learner's Book page 115

Learners discuss answers.

6.3 **Practise** calculating appropriate selling prices

Learner's Book page 117

1. **a.** R425,50 + (15% × 425,50)
= R425,50 + R63,83
= R489,33

b. R425,50 + (45% × 425,50)
= R425,50 + R191,48
= R616,98

c. R425,50 + (100% × 425,50)
= R425,50 + R425,50
= R851,00

2. Cost to produce 20 ℓ ice cream: R120,00

Cost to produce 220 ml

220 ml = 0,22 ℓ
= R120 ÷ 20 ℓ × 0,22 ℓ
= R1,32

a. R1,32

b. R1,32 + (60% × R1,32)
= R1,32 + R0,79
= R2,11

c. R1,32 + (180 × R1,32)
= R1,32 + R2,88
= R3,70

3. a. i. $\frac{14\,650 + (22\% \text{ of } 14\,650)}{6}$

$= \frac{14\,650 + 3\,223}{6}$

$= \frac{17\,873}{6}$

= R2 978,83 per vehicle per month excluding VAT

ii. Assuming the vehicle can be rented out every day of the month:
365 ÷ 12 = 30,42 ≈ 30
R2 978,83 ÷ 30 = R99,29 per vehicle per day excluding VAT

b. i. $\frac{14\,650 + (60\% \text{ of } 14\,650)}{6}$

$= \frac{14\,650 + 8\,790}{6}$

$= \frac{23\,440}{6}$

R3 906,67 per vehicle

ii. Assuming 30 days per month:
R3 906,67 ÷ 30 = R130,22 per vehicle per day

c. i. $\frac{14\,650 + (100\% \text{ of } 14\,650)}{6}$

$= \frac{29\,300}{6}$

= R4 883,33 per vehicle per month

ii. Assuming 30 days per month:
R4 883,33 ÷ 30 = R162,78

4. CP = cost price
SP = selling price
P = profit rate

$CP = SP \div \frac{(100 + P)}{100}$

a. $CP = R8{,}55 \div \frac{(100 + 10)}{100}$

$= R8{,}55 \div \frac{110}{100}$

= R7,77

b. P = 33

$CP = SP \div \frac{(100 + P)}{100}$

$= R8{,}55 \div \frac{(100 + 33)}{100}$

$= R8{,}55 \div \frac{133}{100}$

= R6,43

c. P = 200

$CP = R8{,}55 \div \frac{(100 + 200)}{100}$

$= R8{,}55 \div \frac{300}{100}$

= R2,85

5. a. Assuming occupancy of three nights per week:
$R495 \times 2 \times 4 \times \frac{3}{7} \times 365 \times (100\% + 30\% \text{ profit})$
= R805 294,29

b. $R495 \times 2 \times 4 \times \frac{3}{7} \times 365 \times (100\% + 70\% \text{ profit})$
= R1 053 077,14

c. $R495 \times 2 \times 4 \times \frac{3}{7} \times 365 \times (100\% + 150\% \text{ profit})$
= R1 548 642,86

6.4 **Investigation part 2:** Budget to achieve different percentage profits

Learner's Book page 119

Answers will differ.

6.5 **Practise** doing break-even analyses

Learner's Book page 122

1. a. i. $R0{,}80 \times x = R485 \times 3 + (R0{,}80 \times 5\%)x$

$0{,}8x = R1\,455 + 0{,}04x$

$0{,}76x = R1\,455$

$x = 1\,914{,}47$

Round off to 1 915 downloads of any of the three songs.

Note: The break-even analysis does not need to be calculated for each song. It only needs to be calculated for the total number of downloads.

ii. $R0{,}80 \times x = R485 \times 5 + (R0{,}80 \times 5\%) \times x$

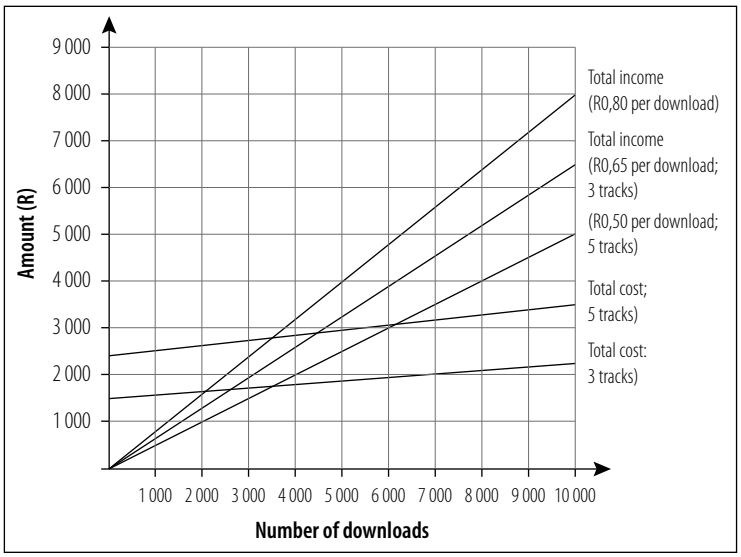
$0{,}80x = R2\,425 + 0{,}04x$

$x = 3\,190{,}79$

Round off to 3 191

The band would need 3 191 downloads of any of the five tracks to break even.

b.



Break-even points

If they sell individual songs at 0,80 each

If they record 3 songs: approximately 2 050 downloads

If they record 5 songs: approximately 3 500 downloads

If they sell three songs at R0,65 each

If they record 3 songs: 2 600 dowloads

If they record 5 songs: 4 400 downloads

If they sell 5 songs at R0,50 each; they must record 5 songs: this is approximately 6 200 downloads.

2. a. Total income = total costs

$R30 \times x = R4\,800 \times 2 + R2\,200$

$30x = R11\,800$

$x = 393{,}33$

Round off to 394.

The barbers need to give 394 haircuts per month to break even (they each need to give 197 haircuts to break even).

b. Assuming 4 weeks per month:

Profit per month = price of haircut × 2 barbers × number of haircuts per week × 4 weeks per month – total costs per month

Profit = R30 × 2 × (15 × 5 + 10) × 4 – (R4 800 × 2 + R2 200)
= R30 × 2 × 85 × 4 – R11 800
= R20 400 – 11 800
= R8 600

The barbers make a profit of R8 600 per month.

c. **i.** One barber

Total income = total costs
$R30 \times x = R4\,800 \times 2 + R3\,800 + R2\,200$
$30x = R15\,600$
$x = 520$ haircuts per month to break even

The barber needs to give 520 haircuts per month to break even.

ii. Two barbers

$R30 \times x = R4\,800 \times 2 + R3\,800 + R2\,200$
$30x = R19\,400$
$x = 646{,}67$

Round off to R647.

The barbers would need to give 647 haircuts per month to break even.

d. **i**. Two permanent barbers (each gives 15 haircuts on weekdays and 10 haircuts on Saturdays) and one new barber (gives 15 haircuts each weekday):

Monthly profit
= (price × number of haircuts per week × 4 weeks) – costs
= {R30 × [4(3 × 15 × 5) + 2(10)]} – [2(R4 800) + R3 800 + R2 200]
= [R30 × [4(225 + 20] – (R9 600 + R3 800 + R2 200)
= R30 × 4(245) – R15 600
= R30 × 980 – R15 600
= R29 400 – R15 600
= R13 800

ii. Two permanent barbers (each gives 15 haircuts per day and 10 on Saturdays) and two new barbers (each gives 15 haircuts on each weekday):

Monthly profit
= (price × number of haircuts per week × 4 weeks) – costs
= {R30 × [4(4 × 15 × 5) + 2(10)]} – [2(R4 800) + 2(R3 800) + R2 200]
= [R30 × [4(300 + 20] – (R9 600 + R7 600 + R2 200)
= R30 × 4(320) – R19 400
= R30 × 1 280 – R19 400
= R38 400 – R19 400
= R19 000

6.6 **Investigation part 2:** Do break-even analyses for different small businesses

Learner's Book page 122

Answers will differ.

Revision and consolidation

Learner's Book page 124

1. a. The bank requires the following from the applicant:
- identity document
- original proof of residential address
- latest salary
- three months' bank statements

b. A multi-loan is a loan of up to R4 000 that is only for one month. It is repayable in full each month. The amount requested is transferred to the person's transaction or savings account using an ATM, cellphone or internet banking. Interest and fees are only charged when the money is transferred to the savings or transaction account. A loan can be as much as R230 000 over a period of 2 to 84 months. It is repayable in fixed monthly repayments.

c. The compound interest method is used.

d. If you are retrenched, the insurance company will repay the amount owing on the loan. You will not be required to pay back the loan. You will not be blacklisted by the credit agencies and it will be easier to cover your expenses without having to pay back the loan.

e. In addition to interest, you pay one initiation fee and a monthly service fee. (There is no credit life insurance.)

2. a. Yes, the 26-year-old must submit an ITR12. You must submit an ITR12 if you are under 65 years of age and received an income of more than R59 750 from one or more part-time jobs. The 26-year-old earns R95 850 from the two part-time jobs.

b. Yes, you must submit an ITR12 if you earned an income by letting property.

c. You need a working email address and access to a computer with internet access to submit your ITR12 by eFiling.

d,e. If you go to a SARS branch to file an ITR 12 electronically, you will need the following:
- your original ID or passport, a certified copy of the ID or passport; in the absence of an ID/Passport, an affidavit together with a temporary ID/passport
- original bank statement with bank stamp that is not older than three months
- original proof of address not older than three months with your name and residential address
- medical aid certificates and receipts
- retirement annuity certificates
- IRP5/IT3a certificates received from your employer
- if you receive a travel allowance, your travel logbook
- tax certificates in respect of investment income IT3(b)
- if applicable, a completed confirmation of disability (ITR-00)
- if applicable, information relating to capital gains transactions
- if applicable, the approved voluntary disclosure programme (VDP) agreement between yourself and SARS for years prior to 17 February 2010
- if applicable, financial statements for business income
- any other documentation relating to income you received or deductions you want to claim.

3. a. 8 × R75,44 = R603,52 (excl. VAT) per month
R603,52 + 14% = R688,0128 ≈ R688,01 (incl. VAT) per month
Paid in total in 2010/11: R688,01 × 12 = R8 256,12 (incl. VAT)

b. 5,5%

c. R278,26 + 14% = R317,2164 ≈ R317,22 (incl. VAT) per month for three removals per week

Weekly cost to a business with three containers that were emptied once a week in 2011/12 (assuming four weeks per month):
Cost per container per week: R95,11 ÷ 4 ≈ R23,78

Cost for three containers per week:
R23,78 × 3
= R71,34 (excl. VAT)
= R71,34 + 14%
≈ R81,33 (incl. VAT)

d. Solid waste removal expenses for:

16 ordinary containers:
Monthly costs for five removals per week of one container: R451,87
Monthly costs for the removal of 16 such containers:
R451,87 × 16 = R7 229,92

Annual costs for the removal of 16 such containers:
R7 229,92 × 12 = R86 759,04

Annual costs including VAT:
R86 759,04 × 114%
= R98 905,31

Three lockable containers:
Monthly costs for removal of one container: R95,11
Monthly costs for the removal of three containers: R95,11 × 3 = R285,33

Weekly costs for removal of three such containers five times per week (assuming four weeks per month):
R71,33 × 5 = R356,65

Annual costs for the removal of three such containers:
R356,65 × 52 weeks
= R18 545,80 per year

Annual costs including VAT:
R18 545,80 × 114%
= R21 142,21

Total waste removal expense for all containers:
R98 905,31 + R21 142,21
= R120 047,52 (including VAT)

4. a. i. Referees' basic fees

$$\frac{\text{R1 993 850} - \text{R1 291 780}}{\text{R1 291 780}} \times 100\% = 54{,}35\% \approx 54\%$$

Referees' basic fees increased by 54%.

ii. Referees' match fees

$$\frac{\text{R4 505 320} - \text{R4 897 475}}{\text{R4 897 475}} \times 100\% = -8{,}01\% \approx -8\%$$

Referees' match fees decreased by 8%.

b. Gate-taking expenses

$$\frac{21\,760\,954 - 11\,441\,230}{11\,441\,230} \times 100\% = 90{,}2\% \approx 90\%$$

Gate-taking expenses increased by 90%.

c. The gate-taking fees did not change by the same percentage for all the competitions. The fees for the NFD playoffs decreased by almost 96%.

The fees for the premiership increased by over 19 564%, the Telkom Charity Cup increased by 421%, the MTN8 increased by almost 195%, and the Nedbank Cup increased by almost 51%.

d. The prize money for the Nedbank Cup decreased by R100 000.

e. The three biggest expenses for 2011:
Prize money: R79 150 000
Gate-taking expenses: R21 760 954
Board placements: R7 232 129

The main focus of PSL expenditure for competitions relates to the prize money for the winners of competitions (which are sponsored), the costs incurred for gate-takings and for placing sponsorship boards at the grounds. Sponsors are therefore an important priority for the PSL.

5. a. Money distributed to clubs in:
2011: R300 million
(19,5 ÷ 21 × 100 ≈ R93 million)
2007: R93 million
Difference: R207 million

The PSL distributed R207 million more as grants in 2011 than in 2007.

b. 2011 prize money: 13,5 ÷ 21 × R100 ≈ R62 million
2010 prize money: 13 ÷ 21 × R100 ≈ R62 million
2009 prize money: 13 ÷ 21 × R100 ≈ R62 million
2008 prize money: 12 ÷ 21 × R100 ≈ R57 million
2007 prize money: 6,5 ÷ 21 × R100 ≈ R31 million
2007–2008: (57 – 31) ÷ 31 × 100% = 83,87% ≈ 84%
2008–2009: (62 – 57) ÷ 57 × 100% = 8,77% ≈ 9%
2009–2010: (62 – 62) ÷ 62 × 100% = 0%
2010–2011: (64 – 62) ÷ 62 × 100% = 3,23% ≈ 3%

c. Total distribution to clubs in 2010: 71 million

i. Grants

$$\frac{5{,}5 \text{ mm}}{71 \text{ mm}} \times 100\% = 77{,}46\% \approx 77\%$$

ii. Prize money

$$\frac{13 \text{ mm}}{71 \text{ mm}} \times 100\% = 18{,}31\% \approx 18\%$$

iii. Participation fees

$$\frac{3 \text{ mm}}{71 \text{ mm}} \times 100\% = 4{,}23\% \approx 4\%$$

d. 2011 $\frac{78{,}5 \text{ mm}}{21 \text{ mm}} \times$ R100 million
= R373,8 million
≈ R374 million

2007 $\frac{27 \text{ mm}}{21 \text{ mm}} \times$ R100 million
= R128,57 million
≈ R129 million

$$\frac{\text{R374m} - \text{R179m}}{\text{R129m}} = \text{R189,9\%}$$

6. a. $\frac{\text{R30 289 billion} - \text{R27 230 billion}}{\text{R27 230 billion}} \times 100\%$

$= \frac{\text{R3 059 billion}}{\text{R27 230}} \times 100\%$

$= 11{,}2\%$

$\approx 11\%$

b. i. Projected income for electricity (2012/2013):
11% of R8 971 405,00
= R8 971 405,00 + R986 854,55
= R9 958 259,55

ii. Projected income for water (2012/2013):
15,08% of R2 085 289,00
= R2 085 289 + R314 461,58
= R2 399 750,58

iii. Projected income for sanitation (2012/2013):
15,08% of R1 144 122,00
= R1 144 122,00 + R172 533,60
= R1 316 655,60

7. a. Answers should include:
Expenses: fuel, oil, repairs, maintenance, fines
Income: taxi fares, rentals for groups

b. Answers will differ. Learners should include taxi fares for your town or city.

8,9. Learners discuss their answers.

Unit 7
Data handling

Learner's Book pages 131–176

Teaching tips

- This unit revises the steps in a statistical investigation. Refer learners to the flow diagram on page 131 in the Learner's Book and discuss how the steps fit together – they should remember this from earlier grades. Make sure learners understand that the process is cyclical: in reality, the investigation does not stop after the results have been interpreted and analysed because the conclusions often lead to new questions.
- A key skill in statistics is the ability to ask the right questions. Learners need practice in learning to be very specific in the way they frame a research question. You could give them a few imaginary research questions and ask them to explain how the questions might be unclear or inappropriate.
- The tools that learners choose to use to collect data should fit the type of data they are collecting and the question they are asking. Surveys and questionnaires need to be carefully planned and designed if they are to be useful. Spend as much time as necessary looking at examples of questionnaires (printed ones and those designed by learners), critically discuss these to determine which elements are clear and useful and which are not.

- Learners need to be able to organise the data they collect in order to make it easy to work with. Use the results from the national census carried out in 2011 as an example to illustrate how an investigation might result in masses of data. (For example, the census collected the gender, age and education levels of over 50 million South Africans.) Organising the data into frequency tables and representing it on graphs helps researchers to make sense of, and analyse, the data. You can find census data and publications from StatsSA at www.statssa.gov.za/census2011.
- Summary statistics should be familiar to the learners by now. Make sure they are able to calculate these statistics using tables as most of the examples they work with from now on are likely to involve multiples sets of data that are grouped in intervals.
- This year, learners will also divide the data into four equal groups (quartiles) and they will use the upper and lower quartile values to find the interquartile range of the data. This is a measure of how spread out the middle 50% of the data values are and it gives a more useful measure of spread because it is not affected by extreme values (outliers).
- Once learners understand the concepts related to quartiles, you can introduce them to box-and-whisker plots. These diagrams provide a five-figure summary of a set of data (they show the highest and lowest values and the quartiles) as well as any outliers. The shape of a box-and-whisker diagram also shows how the data is distributed. Learners do not have to construct box-and-whisker diagrams, but they must be able to read them and compare two or more sets of data presented in this way.
- Percentiles are also introduced in this topic. Here learners are introduced to the concept and shown how percentiles are used. They will need to use these concepts later when they work with growth charts that use percentiles in the measurement topics.
- Learners should be comfortable working with pie charts, bar graphs, histograms, line graphs and scatter plots. If they are uncertain about any of these representations, revise the basic skills using examples from the skills section before proceeding.
- This year, learners will work with multiple sets of data at the same time so they need to use graphs that can show many sets of data.
- Use the summary table on pages 159 and 160 in the Learner's Book to highlight the advantages and disadvantages of different kinds of graph and encourage learners to use this to help them decide which type of graph is best suited to different sets of data that they collect and/or work with.
- Learners need to interpret and analyse data that they collect, but they also need to be able to critically interpret data that is presented by other people. One of the aims of the work in this unit is to help learners realise that data can be manipulated to give a misleading impression.
- Learners need to become critical consumers and informed citizens and one element of this is being critical when presented with statistics. Businesses often use statistics for marketing purposes to sell their products and they try to present them in ways that will convince as many customers as possible to buy their products. This is not to say organisations are dishonest, it is just to point out that the way you present something can affect how people see it. You may want to refer to some of the claims used in the probability section to illustrate this, but here is another example: A mattress company advertisement that was published in a South African newspapers in 2011 made the following claims:

– The world's fastest growing bedding brand
– Clinical study proves you'll sleep better:
  - 29% improved sleep quality
  - 34% reduced back pain
  - 96% reduced back stiffness.
– Research results were documented in two separate scientific studies conducted by the Director of the Exercise Physiology and Human Performance Laboratory at XYZ University.
– The only mattress to be endorsed by the ABC chiropractors association.

- Point out to learners that the claims are interesting because they sound very mathematical and scientific. However, what do they actually mean? How do you measure, for example, that you are the fastest growing bedding brand in the world? Also, what does that mean – if your competitors increased their sales by 1% to earn $1 million and you increased your sales by 100% to earn $20 000 which is the faster growth? Also, ask questions such as: Why is it the only mattress to be endorsed? Did the mattress company pay for the endorsement? Did they sponsor the research? Incidentally, an internet search shows the research was carried out in 1993 (more than 20 years ago) and that it investigated spinal zone technology and not specific mattresses. These are all important pieces of information that can help you avoid accepting meaningless statistical claims.
- The investigation at the end of this topic involves collecting data and comparing it to data collected nationally. Learners must collect, organise, display and analyse data they collected before comparing it with national data and drawing conclusions about their investigation. They are expected to compile a report at the end of their investigation. You may want to allow the learners to work in small groups to do this investigation.

Solutions

7.1 **Practise** developing questions and collecting data

Learner's Book page 133

1. **a.** Children less than two years of age are not included in the table.

b. 6 782 children are included in the sample. The total is included in the bottom of the table.

c. The health services are classified as:
- public hospitals
- private hospitals
- public clinics or doctors
- private clinics or doctors
- others.

d. Traditional healers, homeopaths, alternative healers

e. Public clinic or doctor (62,9%)

f. 20,4%

g. Neither; most children regardless of age go to a public clinic or doctor.

2. **a.** Answers will differ.

b. Examples of answers include:
- What are the statistics for children aged 0 to 2?
- What are statistics for children for the different age groups living in urban, suburban and rural areas and informal settlements?

c. The general health of most South African children is very positive. 95,3% of females are rated as good or excellent. Only 0,6% of females are rated as poor. 92,2% of males are rated as good or excellent. Only 0,9% of males are rated as poor.

d. A greater proportion of male children aged 5 to 11 suffer from poor health (1,5%) than female children in the same age group (0,5%). A greater proportion of male children in this age group is considered to have fair health (7,3%) compared to female children of the same age.

In general, female children have much lower rates at fair health (4,2%) and poor health (0,6%) compared to male children (6,9% fair health and 0,9% poor health).

e. Children aged 12 to 14 is the healthiest age group with 95,3% of children at excellent and good health.

Sex	Health status	Sample size	Percentage	Quantity
Male	Excellent	599	42,3	273
	Good	599	53,0	298
Female	Excellent	646	42,3	273
	Good	646	53,0	342
Total		1 245		1 186

$\frac{1\,186}{1\,245} \times 100\% = 95{,}3\%$

Simple average method

Age group (years)	Health status		
	Excellent	Good	Total
2–4	37,8%	56,3%	94,1%
5–11	33,7%	59,5%	93,1%
12–14	43,9%	51,4%	95,3%
15–18	46,6%	46,5%	93,1%

7.2 **Practise** planning an investigation and selecting a sample

Learner's Book page 135

1. You could get the statistics for road deaths and accidents for the past two years from the Ministry of Transport and provincial departments of transport. You could also get information from Arrive Alive about the frequency of their advertisements on television, radio and in the printed media.

In this case, the focus is on secondary data rather than gathering primary data. You could also collect data from motorists on their awareness of the Arrive Alive campaign and Ministry of Transport advertisements. To do this, you would need to select a sample of major routes, a representative series of days to carry out the survey (for example, weekdays and weekends) and a sample of vehicles that stop at the service stations on the routes.

2. **a.** For example, if the US dollar to rand exchange rate increases, how does the price of petrol in South Africa change?

- If the US dollar/rand rate goes up, does the petrol price go up?
- If the US dollar/rand rate goes down, does the petrol price go down?

b. Mandla could get the petrol price from the government (Department of Transport) or the Automobile Association (AA).

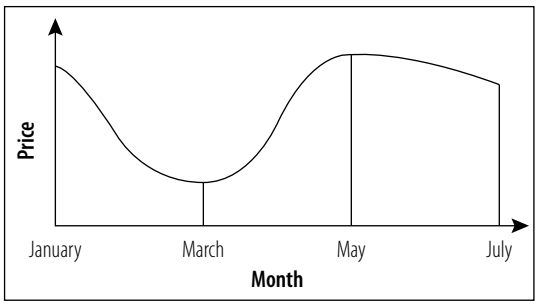
Dollar/rand exchange rates are available from the Ministry of Finance and the Reserve Bank. Economic monitoring agencies or organisations also provide this information, possibly at a cost.

3. a. The exchange rate for the rand/US dollar from January 2012 to July 2012

b. Four decimal places are given.

c. January 2012: R7,80 to US$1
February 2012: R7,64 to US$1
March 2012: R7,66 to US$1
April 2012: R7,74 to US$1
May 2012: R8,40 to US$1
June 2012: R8,45 to US$1
July 2012: R8,20 to US$1

d. The rand price of the US dollar decreases from January to early March. It then increases to the end of May and then decreases again in June and July; it forms an S curve.



e. You would expect to see a similar graph for the petrol price if there was a correlation between the rand/US dollar exchange rate and the petrol price.

7.3 **Practise** evaluating and designing a questionnaire

Learner's Book page 136

1. a. Learners discuss how to answer questions.

b. The question is open-ended. The insured passengers need to give specific answers. There are also instructions for the interviewer, such as prompts for the passenger to give the nearest landmark.

c. The passenger provides confidential information that could be used to prosecute the driver and that could put the passenger in danger.

2. Learners discuss suitable questions and a suitable methodology for a survey.

7.4 **Practise** working with frequency tables

Learner's Book page 140

1. a. i. 0 + 13 + 149 + 97 = 259 passenger vehicles

ii. 14 + 11 + 9 + 3 + 3 + 1 = 41 passenger vehicles

b. 2 + 4 + 2 + 1 + 1 + 0 = 13 minibus taxis and buses were breaking the speed limit.

c. $\frac{\text{vehicles travelling over 100 km/h}}{\text{total vehicles}} \times 100\% \div$ (total passenger vehicles + total minibus taxis and buses + total trucks and other heavy vehicles) $\times 100\%$

$= \frac{7 + 2 + 9}{540} \times 100\%$

$= 3{,}33\%$

$\approx 3\%$

2.

Speed (in km/h)	Vehicles
< 40	4
40–49	78
50–59	243
60–69	131
70–79	25
80–89	17
90–99	24
100–109	13
110–119	4
> 120	1
Total	**540**

3.

Size of household	Urban households		Rural households	
	Tally	Frequency	Tally	Frequency
1–2	𝍸 𝍸 ///	13	//	2
3–4	𝍸 𝍸 𝍸 𝍸 ////	24	𝍸 ////	9
5–6	𝍸 𝍸 //	12	𝍸 𝍸 𝍸 ////	19
7–8	𝍸 /	6	𝍸 𝍸 𝍸 ////	19
9–10	////	4	𝍸 //	7
11–12	/	1	///	3
13–14			/	1
Total		**60**		**60**

b. 3 or 4 people

c. 3 or 4 people
(24 urban households + 9 rural households = 33 households)

d. Rural households are typically larger than urban households.

e. Most urban households have fewer than 7 members.
Very few urban households have more than 8 members.
Very few rural households have fewer than 3 members.
No households have more than 14 members.

f. Answers will differ.

7.5 **Practise** calculating summary statistics

Learner's Book page 144

1. a.

Outcome	Frequency	fx
0	28	0
1	890	890
2	1 442	2 884
3	1 446	4 338
4	1 534	6 136
5	967	4 835
6	669	4 014
7	330	2 310
8	190	1 520
9+	260	2 340
Total	**7 756**	**29 267**

b. Mean = $\frac{29\,267}{7\,756}$
= 3,773 persons per household

c. The mode is four persons per household.

d. Total median position: $\frac{7\,756}{2} = 3\,878$

28 + 890 + 1 442 + 1 446 = 3 806

28 + 890 + 1 442 + 1 446 + 1 534 = 5 340

Therefore, the median falls in the category with four persons per household.

2. a. i. US dollar ($): R7,90680
ii. British pound (£): R12,5205
iii. euro (€): R10,29959

b. i. US dollar ($): R7,48405 – R8,51880
ii. British pound (£): R11,90110 – R13,12244
iii. euro (€): R10,07290 – R10,53344

c. i. US dollar ($): R8,51880 – R7,48405 = 1,03475
ii. British pound (£): R13,12244 – R11,90110 = 1,22134
iii. euro (€): R10,53344 – R10,07290 = 0,46054

The British pound/rand exchange rate fluctuated the most.

d. i. US dollar ($): (R7,78087 + R7,80125) ÷ 2 = R7,79106
ii. British pound (£): (R12,32411 + R12,63419) ÷ 2 = R12,47915
iii. euro (€): (R10,30327 + R10,31074) ÷ 2 = R10,30701

e. There are no values that are the same for all currencies.

7.6 **Practise** interpreting and analysing averages

Learner's Book page 145

1. Answers will differ.

2. a.

Africa	57,67
Europe	79,71
South/Central America	74,58
Asia	74,04

b.

Africa	51,4
Europe	81,4
South/Central America	77,0
Asia	65,4

c.

Africa	52,8
Europe	80,7
South/Central America	74,4
Asia	74,2

d.

Africa	48,2 – 74,8
Europe	74,0 – 81,8
South/Central America	66,6 – 79,1
Asia	65,4 – 83,4

e. 48,2 to 83,4

f. Africa: The median is the most representative, as some countries have very low life expectancies.
Europe: The mean is the most representative, as there are not extreme highs or lows.
South/Central America: The median is the most representative, as there is one extremely low value (Bolivia's life expectancy).

Asia: The median is the most representative, as there are two values (which make up the mode) that are extremely low.

g. Answers will differ.

3. a. Modal numbers:
1960: 3
1965: 2
1970: 2
1975: 1
1985: 1 and 2
1995: 2
2005: 2

b. 1960: 0–6
1965: 0–7
1970: 0–7
1975: 0–5
1985: 0–5
1995: 0–5
2005: 0–5

c.

Number of children	1960 *fx*	1965 *fx*	1970 *fx*	1975 *fx*	1985 *fx*	1995 *fx*	2005 *fx*
0	0	0	0	0	0	0	0
1	220	100	209	350	330	290	309
2	480	572	662	420	660	820	800
3	750	792	627	555	450	390	240
4	760	760	568	340	240	80	140
5	250	395	245	50	50	50	55
6	60	186	54	0	0	0	0
7+	0	70	7	0	0	0	0
Data total	2 520	2 875	2 372	1 715	1 730	1 630	1 544
Frequency total	1 000	1 000	1 000	1 000	1 000	1 000	1 000
Mean	2,520	2,875	2,372	1,715	1,730	1,630	1,544

d. Median number: 1 000 ÷ 2 = 500

1960
40 + 220 + 240 = 500 = 500
So, the median is 2 children.

1965
40 + 100 + 286 = 426 < 500
40 + 100 + 286 + 264 = 690 > 500
So, the median is 3 children.

1970
50 + 209 = 259 < 500
50 + 209 + 331 = 590 > 500
So, the median is 2 children.

1975
160 < 500
160 + 350 = 510 > 500
So, the median is 1 child.

1985
120 + 330 = 450 < 500
120 + 330 + 330 = 780 > 500
So, the median is 2 children.

1995
140 + 290 = 450 < 500
140 + 290 + 410 = 840 > 500
So, the median is 2 children.

2005

165 + 309 = 474 < 500

165 + 309 + 400 = 874 > 500

So, the median is 2 children.

e,f. Answers will differ.

7.7 **Practise** working with quartiles and the interquartile range

Learner's Book page 148

1. a. Pumi scored in the bottom 25% of learners in her grade in the examinations.

b. The difference between the highest and lowest marks in Mathematical Literacy in the country was 85%. The range for the middle 50% of learners – the 25% of learners below the median and the 25% of learners above the median was only 20%.

c. Nabu was in the top 25% of learners in her grade last year.

d. The median mark for Math Literacy was 71%.

e. 25% of learners scored below 50% for Mathematical Literacy.

f. The interquartile range includes only the middle 50% of the values and it does not include the very high or very low values (outliers).

2. a. Median number = 300 ÷ 2 = 150 (average of values 150 and 151)

b. Q_1: 150 ÷ 2 = 75 (values 75 and 76)
Q_3: 150 ÷ 2 + 150 = 225 (values 225 and 226)

c. Q_1: 500 learners: 11 + 34 + 12 + 19 = 76
Q_3: 800 learners: 11 + 34 + 12 + 19 + 33 + 80 + 63 = 226

d. 1 000 – 200 = 800

e. $Q_3 - Q_1 = 800 - 500 = 300$

f. $\frac{11 + 34 + 12 + 19}{300} \times 100\% = 25{,}33\%$
$\approx 25\%$

g. 25%

h. $\frac{63 + 43 + 5}{300} \times 100\% = \frac{111}{300} \times 100\% = 37\%$

3. a. 93 – 34 = 59

b. 57,1

c. 34; 49; 51; 54; 55; 56; 59; 59; 61; 93

$\frac{55 + 56}{2} = \frac{111}{2} = 55{,}5$

d. Q_1: 5 ÷ 2 = 2,5
This is values 2 and 3.

$\frac{49 + 51}{2} = \frac{100}{2} = 50$

Q_3: 5 ÷ 2 + 5 = 7,5
This is values 7 and 8.

$\frac{59 + 59}{2} = 59$

e. 59 – 50 = 9

f. The interquartile range of only 9 compared to a range of 59 indicates that Maryam's scores include high and low outliers (the scores of 34% and 93%). She typically scores between 50% and 59% in tests.

7.8 **Practise** locating values on box-and-whisker plots

Learner's Book page 151

1. a. 4 years
b. 25%
c. 25%
d. 23 – 0 = 23
e. 12 – 2 = 10
f. Answers will differ.
g. 25% of 2 600 = 650
650 teachers have between two and four years' teaching experience.

2. a. There is an outlier that is very low. This represents a technical college with few students enrolled in diploma courses.
b. 1 200 – 360 = 840
c. 750
d. 1 200
e. 880 – 600 = 240
f. The median is 750 students so the minister's statement is correct. More than half of the technical colleges have 700 or more students.
g. Yes. Q_1 is equal to 600 students. The 25% of technical colleges in the lowest quartile (Q_1) have fewer than 600 students.

7.9 **Practise** interpreting box-and-whisker plots

Learner's Book page 153

1. a. Median: 27,1
Range: 32 – 22,4 = 9,6 (9 minutes 36 seconds)
Interquartile range: 27,8 – 25,6 = 2,2 (2 minutes 12 seconds)
b. The distribution has a negatively skewed distribution, although there is a long tail on the right of the distribution graph.

2. a. The median is approximately 63,1 (or 64%).
b. 95% – 34% = 61%
c. Learners discuss the answer.

3. a. 1,65 m
b. 1,6 m
c. Girls: 1,875 – 1,5 m = 0,375 m
Boys: 1,810 – 1,48 m = 0,33 m
The girls have a larger range.
d. Girls: 1,69 – 1,61 = 0,08 m
Boys: 1,65 – 1,55 = 0,1 m
The boys have a slightly larger interquartile range at 10 cm compared to the girls, at 8 cm.
Comments will differ.
e. Answers will differ.

4. a. **Test 1**
The median: 78%.
The range: 87% – 74% = 13%
The first quartile (Q_1): 77%
The third quatile (Q_2): 82%
The interquartile range: 5%
The distribution is positively skewed.

Test 2
The median: 78%
The range: 85% – 74% = 11%
The first quartile (Q_1): 76%
The third quatile (Q_2): 84%
The interquartile range: 84% – 76% = 8%
The distribution is positively skewed.

b. Answers will differ.

5. Answers will differ.

7.10 **Practise** working with percentiles

Learner's Book page 158

1. **a.** 10%
b. 85%
c. approximately 70%
d. approximately 85%
e. 42% to 85%
85% – 42% = 43%
f. Yes, the Department of Education should be concerned. Approximately 85% of learners scored 50% or less. 50% of learners scored 25% or less on the test scores. However, if the tests were very difficult, the department should not be concerned about the learners, but rather about the difficulty of the test.

2. Yes, 92% of learners scored less than Kholiswa.
No, we don't know what her marks were.

3. **a.** It shows the ratings for Munwabisi Middle and High School on the National Achievements Tests for Reading, Language, Mathematical Literacy and the mean score for the three subjects for Grades 7 to 12.
b. Answers will differ.
c. Mathematical Literacy is the lowest of the three subjects in each grade.
d. Answers will differ.

7.11 **Practise** working with multiple sets of data

Learner's Book page 162

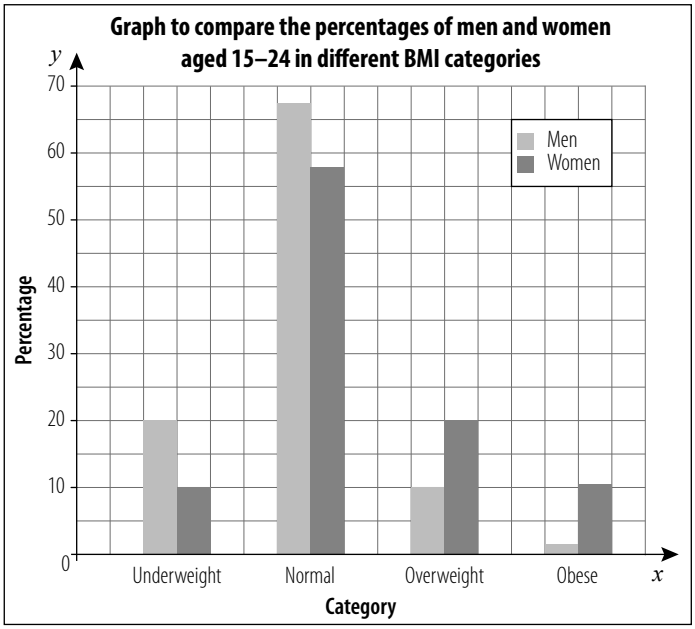
1. **a.** Many males (19,9%) and females (10,6%) aged 15 to 24 are underweight. Males have a higher rate of being at normal BMI, compared to females at all ages. Rates of overweight and obesity rise for males with age. For females aged 35 and over, there are high rates of being overweight and obese.

The data shows the distribution of men and women aged 15 and above by BMI. The distribution of male and female BMI is divided into the categories underweight, normal, overweight and obese.

b. South African Domestic Health Survey (Department of Health)
c. **i.** Men: 3 307
ii. Women: 4 479
d. Overweight: 110
Obese: 20
e. Overweight: 240
Obese: 134
(Remember to round off to the nearest integer.)
f. Age group 15 to 24

g. Ages 45–54 and 65+

h.



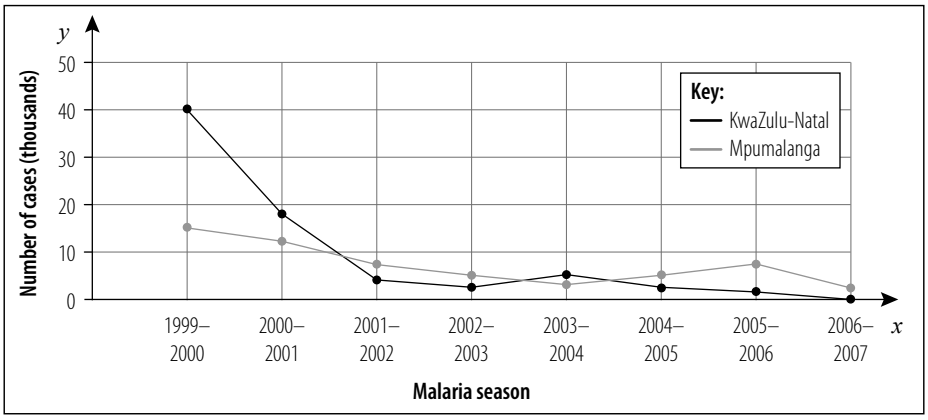
2. a.

Year	Mpumalanga	KZN
2005	3 077	1 220
2006	4 558	1 236
Total	**7 635**	**2 456**

b. No, the statistics are not the same for sources A and B for Mpumalanga and KZN. Source A uses different time periods: 2004/5, 2005/6 and 2006/7.

c. There are more fatalities when there are more cases of malaria infection. However, there is no direct proportion between the two statistics. Reasons will differ.

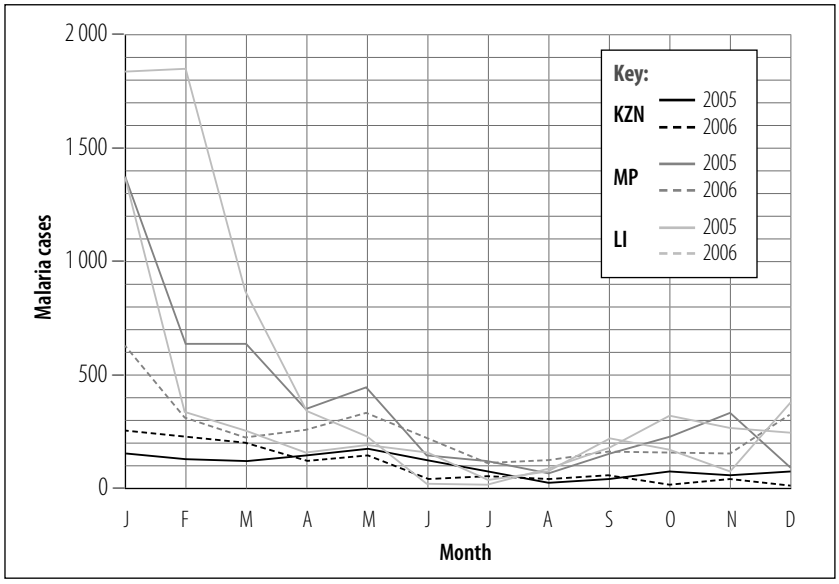
d. Learners' graphs may vary in terms of scale, but they should all follow the general pattern shown in the graph below.



e. In KwaZulu-Natal, the malaria cases were very high to start with, these dropped rapidly from 1999 to 2002 before rising slightly in 2003, however, they dropped again after that to a low level. In Mpumulanga, the number of cases was lower to start with. The number of cases dropped in 2004 before rising slightly in 2005. Since 2001, the number of cases in Mpumulanga has been slightly higher than the number of cases in KZN (except for the 2003 season in KZN).

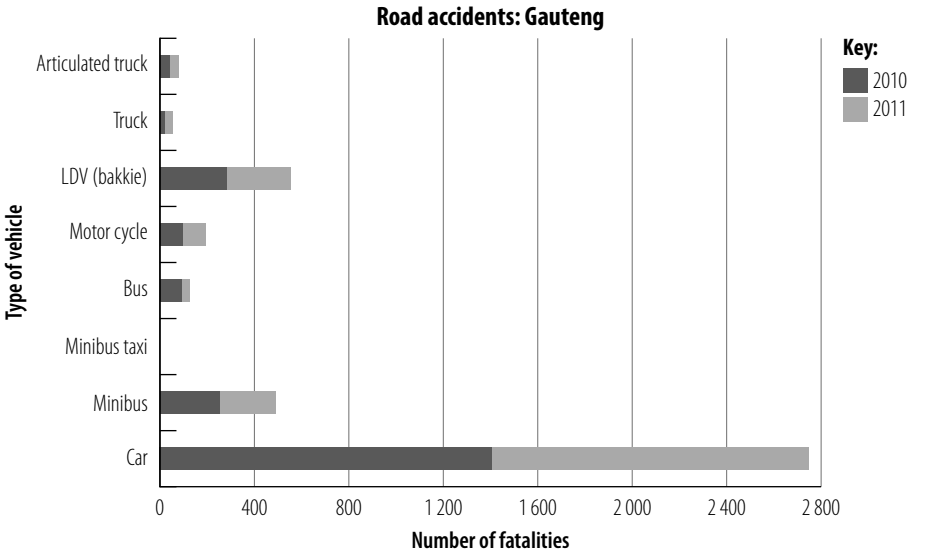
f. Learners could either choose a compound bar graph or a multiple line graph to show this data. A graph they could draw is given on the next page

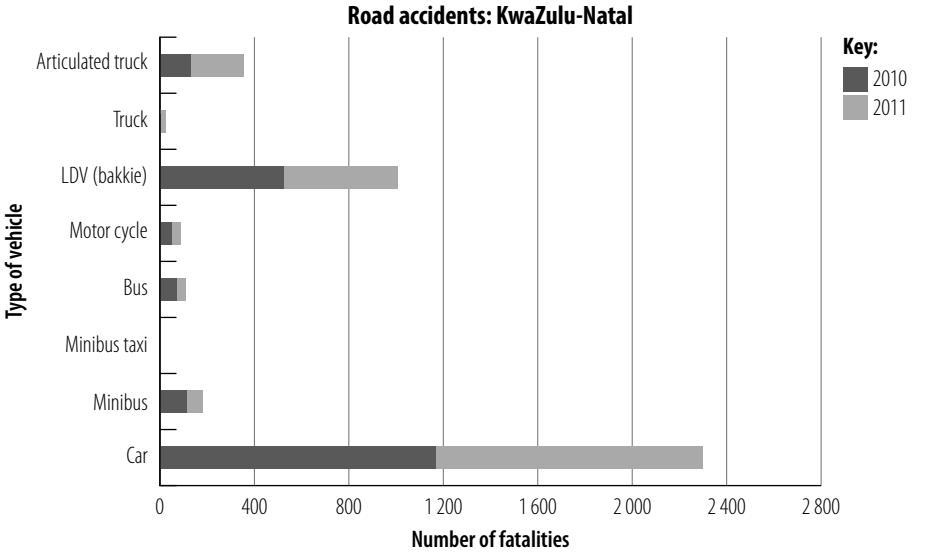
as an example, but other versions are possible. (Note that some learners may add the number of cases and just show the data for the two years, this is also an acceptable answer).

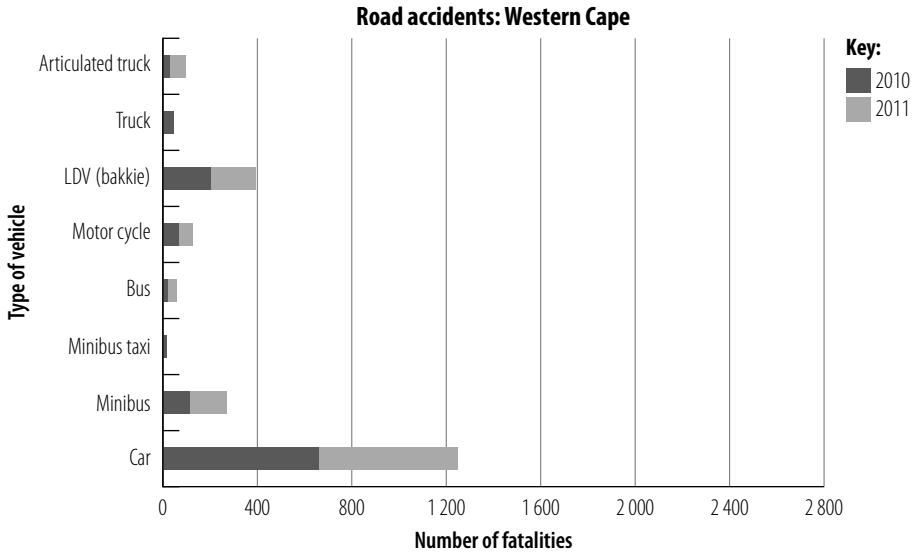


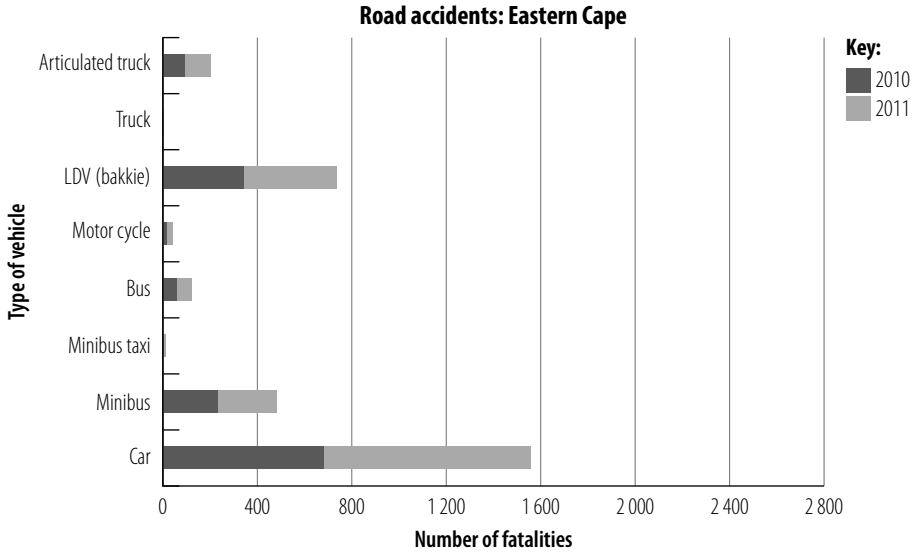
g. Learners' support their choice of graph.

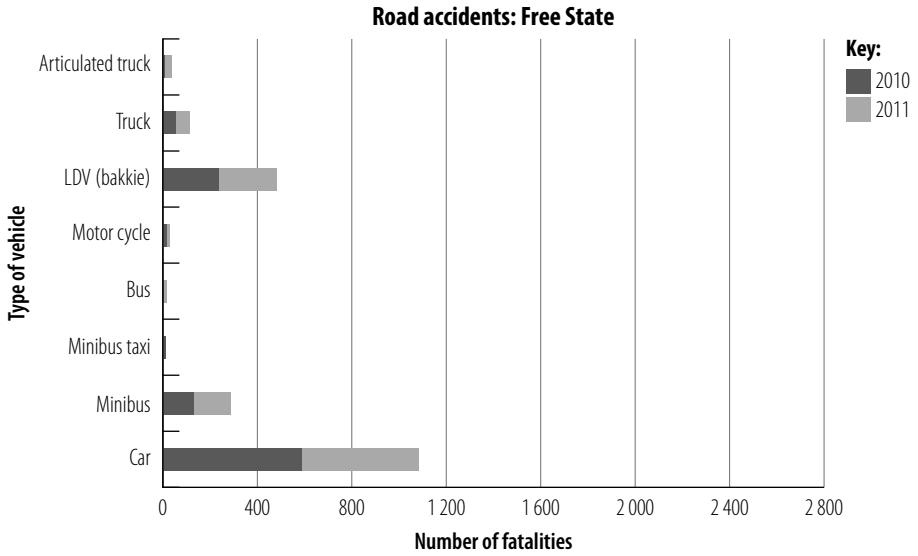
3. a. Examples of stacked bar graphs

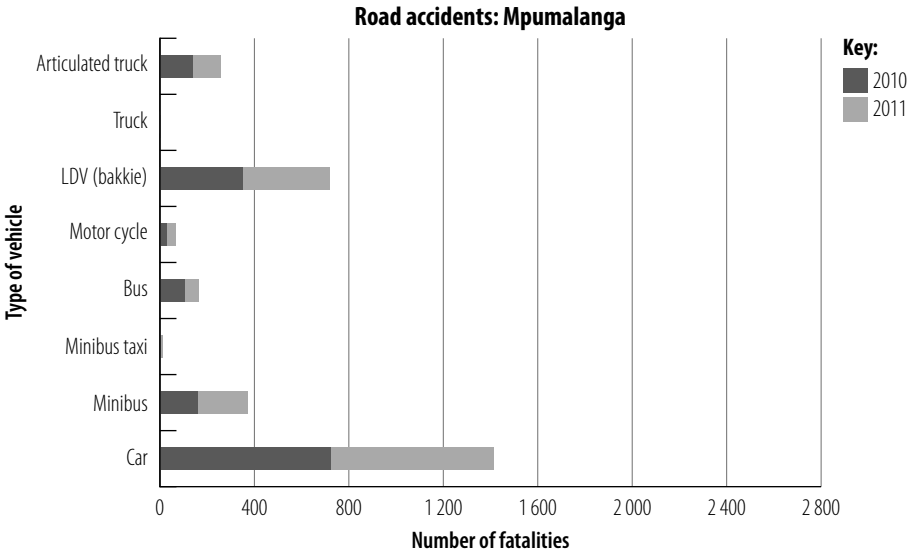


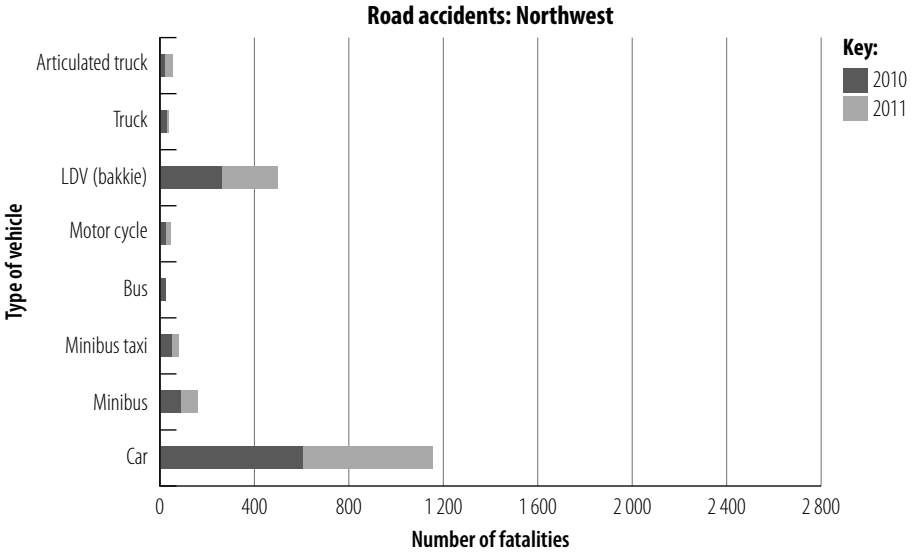


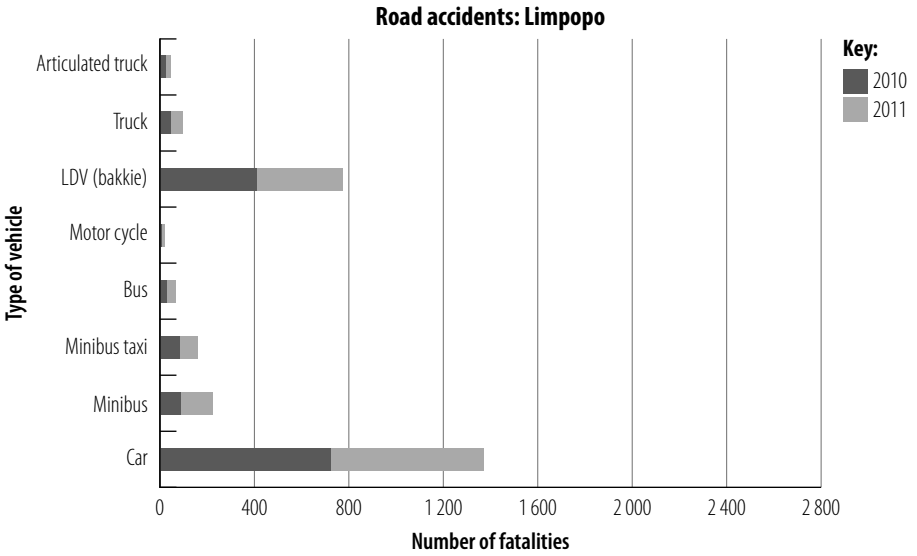

Road accidents: Western Cape
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities

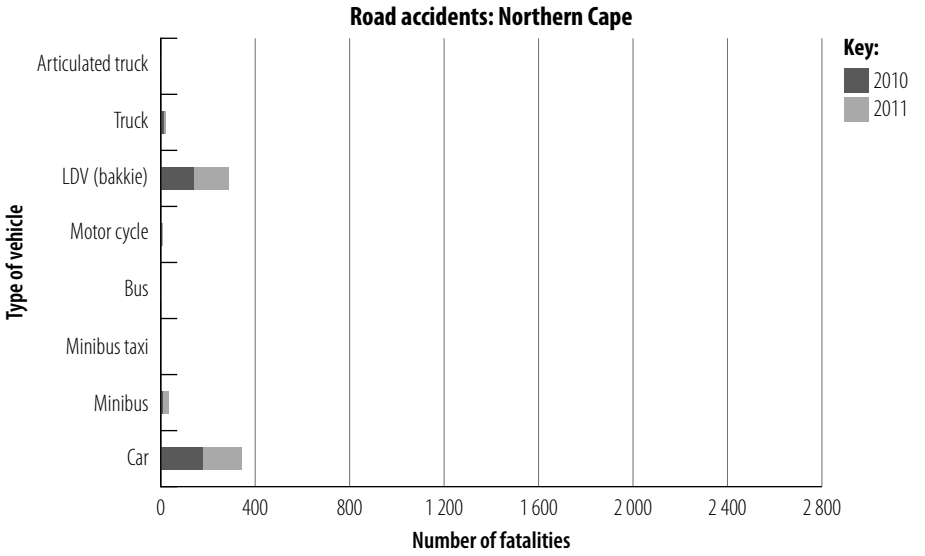

Road accidents: Eastern Cape
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities


Road accidents: Free State
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities

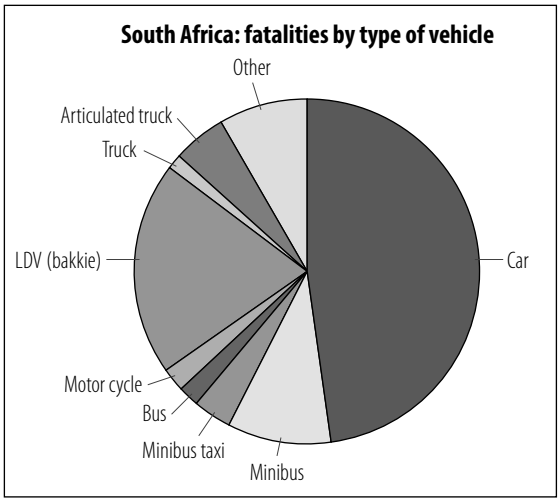

Road accidents: Mpumalanga
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities


Road accidents: Northwest
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities

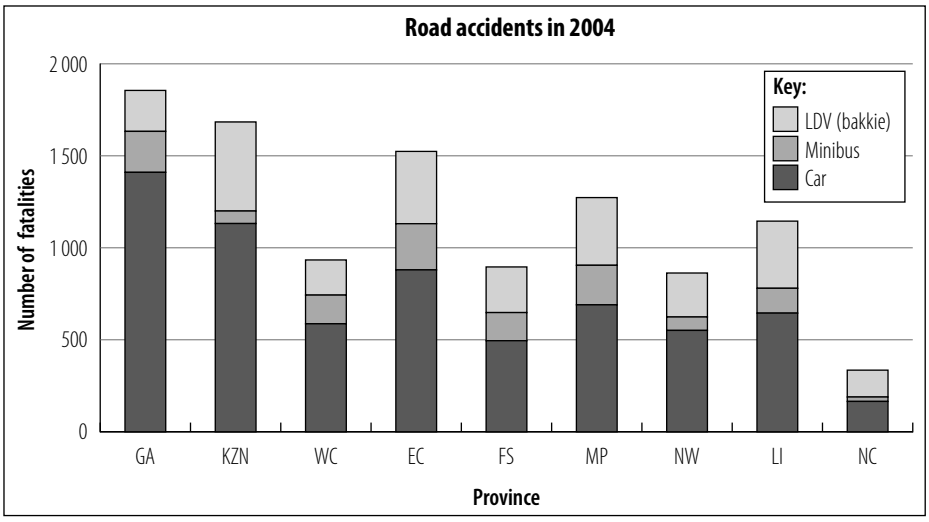

Road accidents: Limpopo
Key:
2010
2011
Articulated truck
Truck
LDV (bakkie)
Motor cycle
Bus
Minibus taxi
Minibus
Car
Type of vehicle
0
400
800
1 200
1 600
2 000
2 400
2 800
Number of fatalities



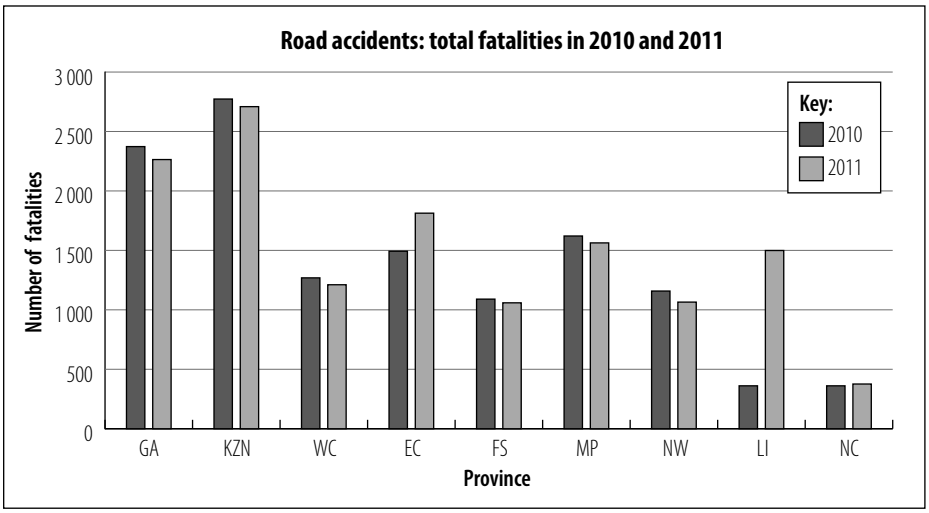
b. The size of learners' pie charts will vary, but the angles should be the same as the one below.



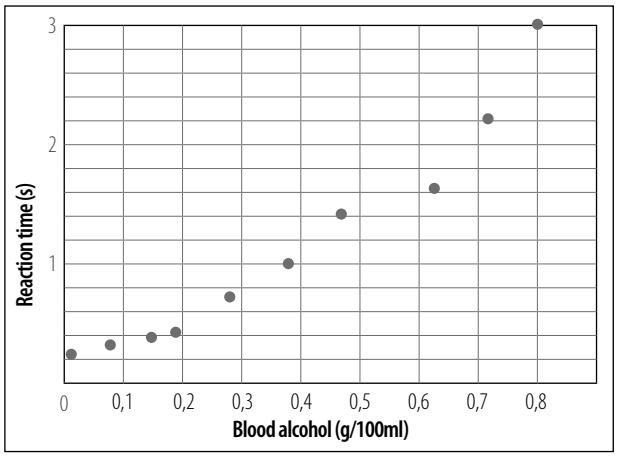
c. Learners' bar graphs will vary depending on the scale they use and whether they use a vertical or horizontal bar graph. The general trend should be similar to the one below.



d. Learners' double bar graphs will vary depending on the scale they use and whether they use a vertical or horizontal bar graph. The general trend should be similar to the one below.



4 a.



b. There is a strong positive correlation. The more you drink, the longer the reaction time.

c. **i.** Between 0,27 g/100 ml and 0,37 g/100 ml

ii. No, reaction times at that level are almost double the safe reaction time.

iii. Answers may differ. This could depend on religious and other opinions. However, statistically, a blood alcohol level of 0,2 g/100 ml would meet the criteria for safe reaction times. This is the legal limit in some countries, although other countries (such as the United Kingdom) have a limit of 0,8 g/100 ml with higher restrictions (no alcohol at all) on certain types of driver (for example, those who drive public transport, ambulances or police vehicles).

7.12 **Practise** critically interpreting and analysing data

Learner's Book page 67

1. a. The number of cases of malaria
The intervals on the axis are in 10 000s.

b. The number of deaths from malaria
The intervals are in 50s.

c. **i.** 1971: fewer than 1 000
ii. 2000: 62 000
iii. 2007: about 8 000

d. **i.** 1971: fewer than 10
ii. 2000: about 425
iii. 2007: about 55

e. The number of cases and deaths from malaria were low from 1971 to 1995. With the introduction of synthetic pyrethroids in 1996, malaria cases and deaths increased rapidly and peaked in 2000 when DDT was reintroduced in South Africa. The number of cases and deaths then declined rapidly, and from 2001 to 2007 levelled off although at a higher rate than prior to 1997.

f. No, it was not successful. The numbers of cases of malaria and deaths as a result of malaria increased after the introduction of synthetic pyrethroids.

g. There may have been more mosquitoes in 1999 and 2000 as a result of the rain. More mosquitoes (which lay their eggs in stagnant water) would mean a greater chance of malaria being spread.

h. The number of malaria cases declined from a peak of over 60 000 in 2000 to 15 000 cases in 2002, and 49 incidences between 2002 and 2007.

i. **i.** The death rate looks very high as a different scale (on the right of the graph) is used.
ii, iii. Answers will differ. Learners should motivate their answers clearly.

j. Answers will differ.

2. **a.** KZN (from 1988 to 2001)
In 2002 and 2003, KZN had the lowest rates.

b. KZN: approximately 41 000
Limpopo: approximately 9 000
Mpumalanga: approximately 13 750

c. Approximately 63 750

d. Answers will differ.

e. The trend is similar to that of the graph in question 1. However, the increase in incidents from 1997 to 1999 is not as apparent as shown in the graph in question 1.

3. **a.** The number of cases of malaria infection in KZN

b. The number of deaths (fatalities) from malaria infection in KZN

c. 0,5% fatalities

d. 0,9%

e. 0,9% × 2 000 cases = 18

f. The case fatality rate has risen. A possible reason is drug-resistant malaria that does not respond well to treatment.

4. **a.** The proportion of people in each regional continent who is at risk and at high risk from malaria infection

b. The Americas

c. Malaria is not found in Europe.

d. Suspected cases of malaria infection and probable and confirmed cases of malaria

e. Learners complete copies of table and discuss their answers.

f. Americas
Reasons will differ.

7.13 Investigation: Are learners at your school at risk of being exposed to second-hand tobacco smoke?

Learner's Book page 170

Investigations will differ.

Revise and consolidate

Learner's Book page 199

1. a. Mode
b. A bar graph
c. A box-and-whisker diagram
d. Percentile

2. a. The range is the difference between the highest and lowest values in the data set. The interquartile range is the range between the first quartile (Q_1) and the third quartile (Q_3). This measures the middle 50% of values and excludes outliers.
b. A quartile of a set of data is the 25th, 50th or 75th percentile. The lower quartile is the value that has the lowest quarter (25%) of values in the data set below it. The upper quartile has 75% of the values below it.

3. a. 68
b. The score of 141 is an outlier: an extreme score.
c. 99
d. lower quartile: 91
upper quartile: 107
interquartile range: 107 – 91 = 16
e. **i.** 99
ii. 91
iii. 105 to 127

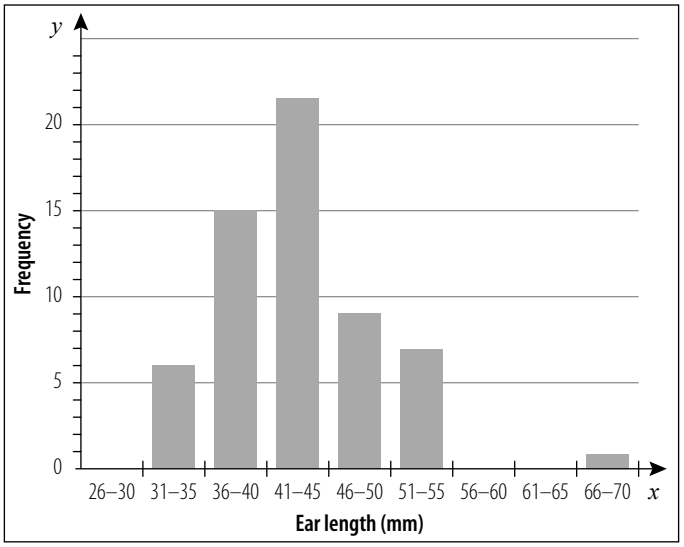
4. a. 95% of persons in his age group are shorter than Malusi.
b. Sindi scored more than 80% of the other students in her music exam. Sindi scored in the top 20% of students.

5. a. Sum of all scores: 2 655
Data set: 60
Mean: 44,25
b. Highest value: 70
Lowest value: 32
Range: 70 – 32 = 38
c.

Ear length	Tally	Frequency
26–30		0
31–35	𝍸 I	6
36–40	𝍸 𝍸 𝍸	15
41–45	𝍸 𝍸 𝍸 𝍸 II	22
46–50	𝍸 IIII	9
51–55	𝍸 II	7

Ear length	Tally	Frequency
56–60		0
61–65		0
70	/	1
Total		**60**

d.

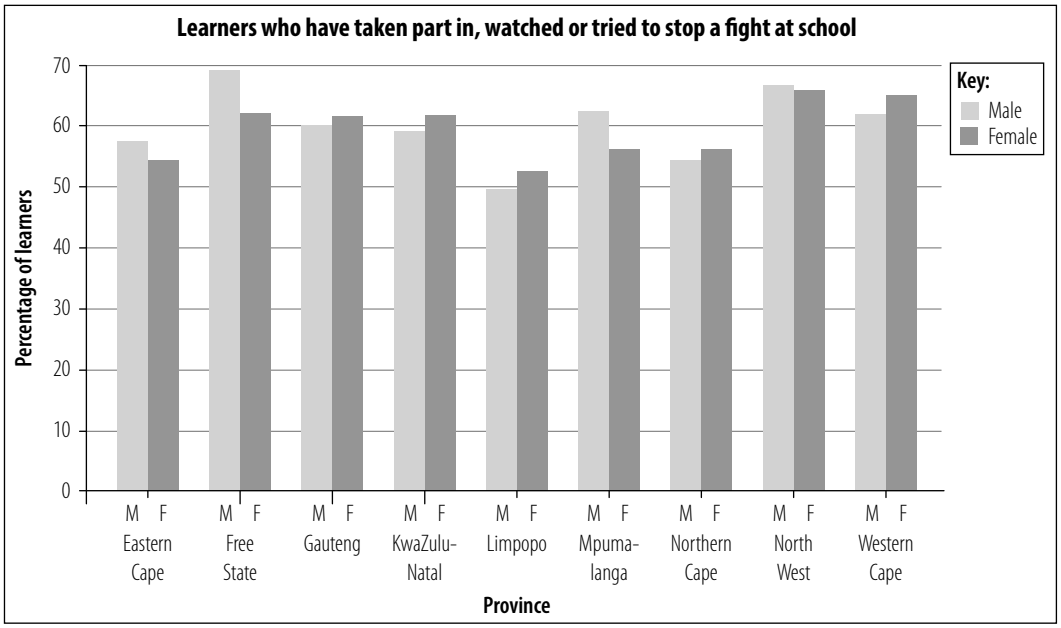


6. **a,b.** Answers will differ.

7. **a.** Male: 25,64%
Female: 16,32%

b. 4 949 × 25,64% = 1 269
5 148 × 16,32 = 840

c.



d–f. Answers will differ.

8. **a.** The first graph shows the racial distribution (by percentage) of different levels of education.

The second graph shows the level of education (by percentage) for black Africans, coloureds, Indians/Asians and whites.

b. Answers will differ.

TERM 2

WORKED ANSWERS

The concepts, methods and scenarios in Unit 1 (Interest and interest rates) and Unit 2 (Banking, loans and investments) are closely related. You may choose to work through the examples and activities in the order in which they are given in each unit, or to select sections of the units for learners to do together – for example, interest rate calculations in Unit 1 and related activities in Unit 2 that have to do with a particular investment or loan scenario.

Unit 1
Interest and interest rates

Learner's Book pages 178–203

Teaching tips

- In Grade 10 and Grade 11, learners were introduced to the concepts of simple interest or compound interest, and they learned how to use given interest rates to calculate interest on loans and investments (savings). This unit begins by revising the main methods involved in these calculations, as well as the terminology used to talk about interest. You can use these revision activities as a form of baseline assessment of learners' knowledge and skills in this section.
- Learners need to be able to analyse scenarios that involve changing interest rates and changing balances in savings or investment accounts. The ability to calculate balances and interest amounts is important, but so is the ability to explain verbally and/or in writing which changes are involved in each situation – encourage learners to discuss and report on the activities so that you can check that they have grasped each concept fully.
- Using graphs to show and compare interest scenarios will draw on learners' skill at drawing and interpreting graphs, as taught in Grade 10 and Grade 11 and developed further this year. Link the activities in this section to other work with graphs that learners do, and add more scenarios that are relevant if learners need further practice.
- All the major South African banks have websites that provide descriptions of loan and investment accounts, with examples of the payments or earnings involved. You will find additional source material for activities on these websites if you think learners need more practice in developing their calculation and analysis skills.
- In the section relating to long-term investments, encourage learners to debate the value of a special product such as a funeral plan, as compared to a savings or investment account. They should consider whether the special product offers benefits that are different from a bank account (for example, helping people to be disciplined enough to save, by committing them to a regular monthly amount) or disadvantages (for example, perhaps the financial benefit would be greater in an investment account).

- In the section on long-term debt, learners should consider the benefits and disadvantages of being committed to long-term loan agreements such as a hire purchase (HP) or a home loan. They need to understand that the real cost of a debt may be much higher than the initial loan amount, and discuss how a person can plan for such a scenario if they have to take out this type of loan. The example in the unit of repaying a home loan with bigger monthly repayments is an important way to illustrate how personal financial discipline can be of benefit in the long run.

Solutions

1.1 **Practise** calculating simple and compound interest

Learner's Book page 186

1.

Investor	Principal	Interest rate (p.a.)	Term	Closing balance
Bongani	R12 000	14,0%	48 months	R18 720,00
Steven	R4 720	9,2%	12 years	R9 930,88
Nazim	R2 800	6,35%	5 years	R3 689,00
Francois	R1 765	10,1%	30 months	R2 210,66
Kgomotso	R1 350	8,0%	18 months	R1 512,00
Thobeka	R1 000	7,75%	2 years	R1 155,00
Jocelyn	R800	4,2%	8 years	R1 068,80
Wandi	R530	22,5%	3 years	R887,75

2. **a.** Compound interest rate: 4,85%

Month 1

$R170\,000 + (R170\,000 \times 4{,}85\% \times \frac{1}{12})$
$= R170\,000 + R687{,}08$
$= R170\,687{,}08$

Month 2

$R170\,687{,}08 + (R170\,687{,}08 \times 4{,}85\% \times \frac{1}{12})$
$= R170\,687{,}08 + R689{,}86$
$= R171\,376{,}94$

Month 3

$R171\,376{,}94 + (R171\,376{,}94 \times 4{,}85\% \times \frac{1}{12})$
$= R171\,376{,}94 + R692{,}65$
$= R172\,069{,}59$

Month 4

$R172\,069{,}59 + (R172\,069{,}59 \times 4{,}85\% \times \frac{1}{12})$
$= R172\,069{,}59 + 695{,}45$
$= R172\,765{,}04$

Month 5

$R172\,765{,}04 + (R172\,765{,}04 \times 4{,}85\% \times \frac{1}{12})$
$= R172\,765{,}04 + R698{,}26$
$= R173\,463{,}30$

Month 6

$R173\,463{,}30 + (R173\,463{,}30 \times 4{,}85\% \times \frac{1}{12})$
$= R173\,463{,}30 + R701{,}08$
$= R174\,164{,}38$

Month 7

R174 164,38 + (R174 164,38 × 4,85% × $\frac{1}{12}$)
= R174 164,38 + R703,91
= R174 868,29

Month 8

R174 868,29 + (R174 868,29 × 4,85% × $\frac{1}{12}$)
= R174 868,29 + R706,76
= R175 575,05

b.

Capital amount	R45 000,00
Period	18 months
Interest rate	4,65%
Final amount	R48 244,30

c. **Loan I**

Capital	R75 000
Period	3 years (36 months)
Interest rate	5,35%
Final amount	R88 025,93
Interest payments	R88 025,93 – R75 000 = R13 025,93

Loan II

Capital	R175 000
Period	3 months
Interest rate	4,40%
Final amount	R176 932,07
Interest payments	R176 932,07 – R175 000 = R1 932,07

The first loan will cost more in interest payments for 36 months.

d. The loans of R60 000 for 18 months – if allowed by the bank – would be cheaper, because the interest rate would only be 4,8% p.a. The total interest charged for the two loans would be R8 940,12. The interest rate charged for the loan of R120 000 for 18 months would be 5,15% (which is greater than 4,8%). The total interest charged for this loan would be R9 616,03.

3. a.

Month	Income	Opening balance	35% added to savings account	Interest earned	Closing balance
Jan	R5 449,00	0	R1 907,15	R11,52	R1 918,67
Feb	R5 212,00	R1 918,67	R1 824,20	R22,61	R3 765,48
Mar	R6 830,00	R3 765,48	R2 390,50	R37,19	R6 193,17
Apr	R5 926,00	R6 193,17	R2 074,10	R49,95	R8 317,22
May	R7 256,00	R8 317,22	R2 539,60	R65,59	R10 922,41
Jun	R6 784,00	R10 922,41	R2 374,40	R80,33	R13 377,14
Jul	R5 937,00	R13 377,14	R2 077,95	R93,37	R15 548,46
Aug	R6 088,00	R15 548,46	R2 130,80	R106,81	R17 786,07
Sep	R6 375,99	R17 786,07	R2 231,60	R120,94	R20 138,61
Oct	R7 253,00	R20 138,61	R2 538,55	R137,01	R22 814,17
Nov	R7 794,00	R22 814,17	R2 727,90	R154,32	R25 696,39
Dec	R5 201,00	R25 696,39	R1 820,35	R166,25	R27 682,99

Note: Interest is calculated as follows:
(opening balance + 35% of deposit) × interest rate × $\frac{1}{12}$

b. Closing balance R27 682,99
Total deposits – R26 637,10
Interest earned R1 045,89

4. a. 10 July 2010

b. Statement A: 31 August 2011
Statement B: 29 February 2012

c. 8,5% p.a.

d. The closing balance for statement A (31 August 2011) is the opening balance for statement B (29 February 2012). The closing balance for statement B equals the opening balance plus the interest earned at a rate of 8,5% p.a. on the capital amount (the opening balance) for the six months September 2011 to February 2012.

e. 31 August 2011 to 29 February 2012: 6 months

$R4\,080{,}55 \times 8{,}5\% \times \frac{6}{12} = R173{,}42$

5. a. $R564{,}20 \times 0{,}25\% \times \frac{1}{12} = R0{,}12$

b.

Month	Opening balance	Deposit	Interest earned	Interest rate*	Closing balance
Feb.	R37 450,65	–	R15,60	0,50%	R37 466,25
Mar.	R37 466,25	–	R15,61	0,50%	R37 481,96
Apr.	R37 481,86	R5 400,00	R17,87	0,50%	R42 899,73
May	R42 899,73	–	R17,87	0,50%	R42 917,60
Jun.	R42 917,60	–	R17,88	0,50%	R42 935,48
Jul.	R42 935,48	–	R17,89	0,50%	R42 953,37

* Credit balance

c.

Month	Balance	Interest charged	Interest rate*	Closing balance
May	R7 226,80	R108,40	18%	R7 335,20
June	R7 335,20	R110,03	18%	R7 445,23
July	R7 445,23	R111,68	18%	R7 556,91

* Debit balance
She would own R7 556,91 at the end of July.

d. Interest calculated at the end of the month on the closing balance

Statement period	Opening balance	Purchases	Payments	Subtotal	Interest paid	Interest rate	Closing balance
Mar.–Apr.	–	984,30	800,00	184,30	2,76	18%	187,06
Apr.–May	187,06	1 278,45	1 000,00	465,51	6,98	18%	472,49
May.–Jun.	472,49	3 400,20	2 000,00	1 872,69	28,09	18%	1 900,78
Jun.–Jul.	1 900,78	621,85	800,00	1 722,63	25,84	18%	1 748,47
Jul.–Aug.	1 748,47	733,90	800,00	1 702,37	25,24	18%	1 727,61
Aug.–Sep.	1 727,61	4 260,56	3 000,00	2 988,17	44,82	18%	3 032,99

Interest paid: R133,73

e. A debit balance of R3 032,99 on 8 September

6. a. Robert pays 6,6% interest.

Month	Opening balance	Interest	Closing balance
Jun.	2 500,00	13,75	2 513,75
Jul.	2 513,75	13,83	2 527,58
Aug.	2 527,58	13,90	2 541,48
Sep.	2 541,48	13,98	2 555,46
Oct.	2 555,46	14,06	2 569,52
Nov.	2 569,52	14,13	2 583,65
Dec.	2 583,65	15,50	2 599,15
Jan.	2 599,15	15,59	2 614,74
Feb.	2 614,74	15,69	2 630,43

Interest paid: R130,43

b. Wandile receives 4,7% interest.

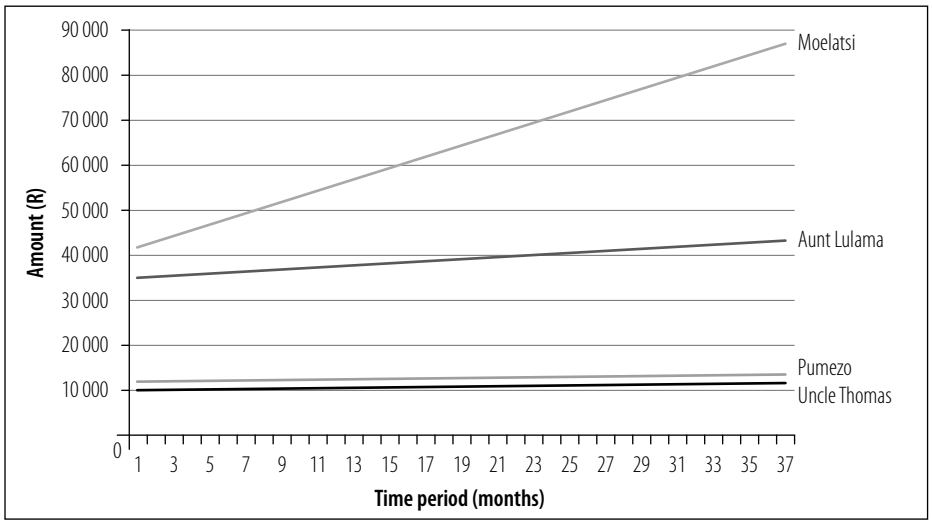
Year	Capital	Interest rate	Interest	Closing balance
1	30 000,00	4,8%	1 440,00	31 440,00
2	31 440,00	4,8%	1 509,12	32 949,12
3	32 949,12	4,8%	1 581,56	34 530,68
4	34 530,68	4,8%	1 657,47	36 188,15
5	36 188,15	4,8%	1 737,03	37 925,18
6	37 925,18	4,2%	1 592,86	39 518,04
7	39 518,04	4,2%	1 659,76	41 177,80
8	41 177,80	4,2%	1 729,46	42 907,26
9	42 907,26	4,2%	1 802,11	44 709,37
10	44 709,37	4,2%	1 877,79	46 587,16

Interest earned: R16 587,16

1.2 **Practice** using graphs to show and compare interest growth

Learner's Book page 192

1. a.



b. The interest on the loans from Uncle Thomas and Pumezo are the cheapest.

c. Answers will differ.

2. Answers will differ.

Learner's Book page 202

1. a. Real cost
Deposit + total instalments
R287 500 × 10% + R8 100 × 36 months
= R28 750 + R291 600
= R320 350

Interest paid
HP price – cash price
R320 350 – R287 500
= R32 850

b. Real cost
Deposit + total instalments
= R12 000 + R5 650 × 24 months
= R12 000 + R135 600
= R147 600

Interest paid
HP price – cash price
= R147 600 – R128 250
= R19 350

c. Real cost
Deposit + total instalments
= R337 900 × 12% + R9 200 × 36 months
= R40 548 + R331 200
= R371 748

Interest paid
HP price – cash price
R371 748 – (R337 900 – 5% × R337 900)
= R371 748 – R321 005
= R50 743

2. a. Real cost of the house
Amount borrowed = R355 000 × 90% = R319 500

Bank A
Monthly payments × 10 years
R4 047,29 × 10 × 12 months
= R485 674,80

Bank B
R3 146,24 × 15 × 12 months
= R566 323,20

Bank C
R2 834,29 × 18 × 12 months
= R612 206,64

b. **Bank A**
R485 674,80 – R319 500,00 = R166 174,80

Bank B
R566 323,20 – R319 500,00 = R246 823,20

Bank C
R612 206,74 – R319 500,00 = R292 706,64

3. Option 1 (14% compounded annually)

Year	Capital	Interest	Amount due
1	92 000,00	12 880,00	104 880,00
2	104 880,00	14 683,20	119 563,20
3	119 563,20	16 738,85	136 302,05
4	136 302,05	19 082,29	155 384,34
5	155 384,34	21 753,81	177 138,15
6	177 138,15	24 799,34	201 937,49
7	201 937,49	28 271,25	230 208,74
8	230 208,74	32 229,22	262 437,96

Option 2 (18% interest compounded annually)

Year	Capital	Interest	Amount due
1	92 000,00	16 560,00	108 560,00
2	108 560,00	19 540,80	128 100,80
3	128 100,80	23 058,14	151 158,94
4	151 158,94	27 208,61	178 367,55
5	178 367,55	32 106,16	210 473,71
6	210 473,71	37 885,27	248 358,98

Option 3 (interest 18%)
Monthly payments: R1 420,48
Payments: 8 × 12 months = 96 months
Total payment: R1 420,48 × 96 = R136 366,08

Option 4 (interest of 10%)
Monthly payments: R971,82
Payments: 15 × 12 months = 180 months
Total payment: R174 927,60

a.

Option	1	2	3	4
Total amount	R262 427,96	R248 358,98	R136 366,08	R174 927,60
Capital amount	R92 000,00	R92 000,00	R92 000,00	R92 000,00
Interest paid	R170 427,96	R156 358,98	R44 366,08	R82 927,60

Option 3's loan of over eight years at 10,5% is the cheapest.

b. Answers will differ.

1.4 Investigation: How much interest can you save by increasing your home loan repayments?

Learner's Book page 203

Learners discuss the findings of their investigations.

Unit 2
Banking, loans and investments

Learner's Book pages 237–269

Teaching tips

- In this unit, learners revise their knowledge of different types of bank account and they analyse the accounts to find which ones are most suitable for people with different needs. Understanding the terminology used to describe the features of these accounts is an important core skill. Check that all learners can easily explain these features and give examples of how they apply in practical situations.
- Calculating, graphing and comparing bank fee options is an opportunity for learners to apply their calculation and graphing skills while demonstrating their ability to analyse bank tariff documents.
- The analysis of long-term savings products will help learners develop a critical understanding of long-term interest growth and projected growth as described by financial service providers. These are concepts learners should discuss in relation to their own financial planning for their future.
- The section on stokvels presents an important approach to savings that is used in many South African communities, and it provides opportunities to people who would not be eligible to open their own bank investment accounts. Encourage learners to consider how the stokvel approach to savings could be applied in their lives. If possible invite members of a few different stokvel clubs to visit the class and explain how their clubs operate.
- Micro-loans are analysed in the unit, as a type of loan that sometimes functions differently to a bank loan. These loans can be useful in certain situations, but they can also lead people into debt trap situations. Help learners recognise the pitfalls of taking out micro-loans, and encourage them to discuss alternative options that they could take if they needed to borrow money.
- The discussion of Islamic banking can be used to raise the question of whether the usual approach to banking used in South Africa is normal in all societies. Learners can consider why it is not permitted to charge or earn interest in the Islamic banking system, and discuss what benefits and drawbacks such a system might have. If possible, invite an expert on Islamic banking to explain in more detail to the class how investments and loans work in this type of banking system.

Solutions

2.1 **Practice** choosing suitable bank accounts for different purposes

Learner's Book page 206

1. **a.** Debit card account
b. Loan account (bond)
c. Savings account
d. Credit card account
e. Current account
f. Fixed deposit account

2. She could open a debit card/current account for day-to-day transactions and a savings account for her to save money. Other answers could also be correct.

3. Answers will differ.

4. Example answers are given below.

Business A could open a current account or savings account for daily transactions. Profits could be included in the savings account.

Business B could open a current account for daily transactions. The business could use a savings account for short-term savings or a fixed deposit for long-term savings.

Business C could open a current account for daily business transactions, a business credit card for credit transactions and even to pay for fuel for a delivery vehicle (if required), and a fixed deposit for long-term savings.

» 2.2 Assignment: Choose the best bank fee option for different accounts

Learner's Book page 211

Answers will differ.

» 2.3 Assignment: Use graphs to compare cash withdrawal and deposit fees

Learner's Book page 218

Answers will differ.

» 2.4 Assignment: Use graphs to show investment values with different growth rates and increased premiums

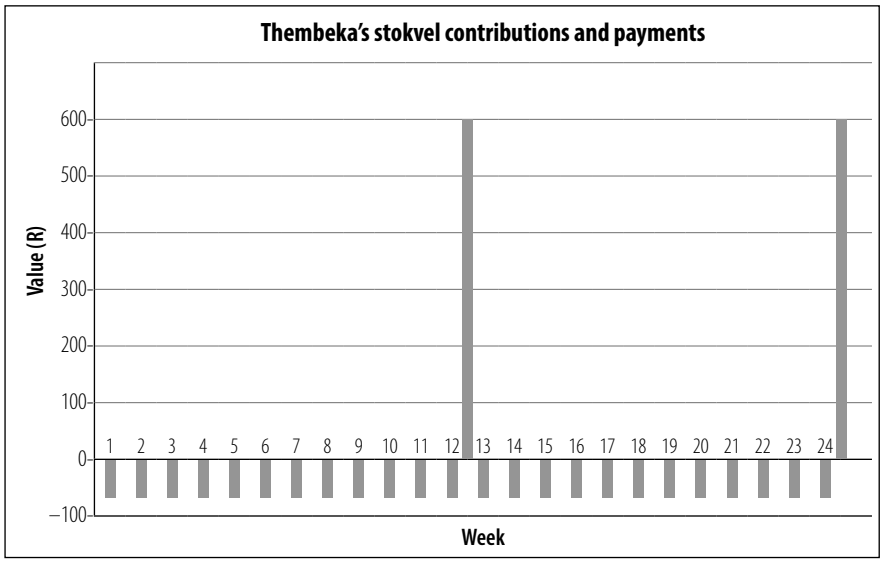
Learner's Book page 221

Answers will differ.

» 2.5 Practise using graphs to show contributions and payouts in a stokvel

Learner's Book page 223

1.



2. a. Learners compare graphs.

b. Stokvel contribution of R150 per person.

R75 is paid out to each member in turn.

R75 is deposited into the bank account.

Interest rate: 4,5% p.a.

R75 deposit per member × 12 members
= R900 per month deposited into stokvel account

Month	Opening balance	Deposit	Interest earned	Closing balance
1	0	R900	R3,38	R903,38
2	R903,38	R900	R6,67	R1 810,14
3	R1 810,14	R900	R10,16	R2 720,30
4	R2 720,30	R900	R13,58	R3 633,88
5	R3 633,88	R900	R17,00	R4 550,88
6	R4 550,88	R900	R20,44	R5 471,32
7	R5 471,32	R900	R23,89	R6 395,21
8	R6 395,21	R900	R27,36	R7 322,57
9	R7 322,57	R900	R30,83	R8 253,40
10	R8 253,40	R900	R34,33	R9 187,73
11	R9 187,73	R900	R37,83	R10 125,56
12	R10 125,56	R900	R41,35	R11 066,91

c. Henette receives R22,24 of interest (a $\frac{1}{12}$ share of the interest earned).

2.6 **Investigation:** Compare the effects of changing interest rates, investment amounts and repayments on the final value of an investment or a loan

Learner's Book page 228

Answers will differ.

Unit 3
Inflation

Learner's Book pages 231–250

Teaching tips

- The work done on inflation in this unit should be linked to work learners did in Term 1 on income-and-expenditure statements and budgets. You can use some of the statements and budgets in the activities in Term 1 as additional resources for calculating the impact of inflation – for example, ask learners to recalculate a given provincial or municipal budget if the inflation rate is 3% or 8,5%.
- In doing calculations in this unit, ask learners to analyse and explain how price rises due to inflation affect the purchasing power of the people or businesses concerned. In this way, learners can develop their understanding of how a financial process such as inflation affects many aspects of people's daily lives, ability to plan for the future and so on.
- The concept of an average is important in the section on average price increases. Check that learners understand what an average tells us about a situation – it gives a general picture of the size of an increase in prices, although an item or a service may change by a percentage that differs from the average price increase due to inflation. By comparing inflation rates for different goods and services, learners will get a better understanding of this concept. Here, as in earlier units, a key calculation skill that learners must have is the ability to calculate percentage increases.

- Let learners compile a list of their households basket of goods as a basis for tracking the effect of inflation on their lives. They can then repeat this activity by focusing on different groups of people to see how inflation affects certain sectors of society. For example, a basket of goods for babies and young children may have an inflation rate that differs from that for teenagers; people who are chronically ill may experience inflation more severely than people who do not need to buy medicine or special foods on a regular basis.
- The inflation graphs in the Learner's Book give learners the opportunity to develop their graph-reading skills. These graphs are also resources for analysing increasing inflation rates and declining/decreasing inflation rates. The graphs show that a decrease in the inflation rate is not a decrease in prices – it is a smaller increase in prices. You will find graphs that give up-to-date inflation rates and trends in the business sections of newspapers and on the internet.
- The last section of the unit links inflation to investment accounts and interest rates. Learners can research the current average inflation rate and compare various investment account options offered by banks in the same period to see which accounts could let long-term savings grow at an interest rate that is higher than inflation.

Solutions

3.1 **Practise** calculating changes in purchasing power because of inflation

Learner's Book page 234

1.

Year 1	**Income**	**Expenditure**	
Fixed salary	R6 600	Home loan repayment	R2 150,00
		Train fare	R826,00
		Groceries and food	R2 500,00
		Clothing account	R750,00
		Cellphone contract	R159,00
		Total	R6 385,00
		Credit balance	R215,00
End of year			**Amount**
Fixed salary			R6 600,00
Home loan (R2 150 + 0,5%)			R2 160,75
Train fare (R826 + 7,5%)			R887,95
Groceries and food (R2 500 + 6,2%)			R2 655,00
Clothing account			R750,00
Cellphone contract			R159,00
			R6 612,70
Debit balance			R12,70

At the start of the year, Fikile's salary covered 100% of his expenses, with a credit balance left over.

At the end of the year, his salary covered $\frac{\text{R6 600}}{\text{R6 612,70}} \times 100\% = 99{,}81$ of his expenses.

b. Year 2

Salary: R6 600 + 5% increase = R6 930,00

Expenditure: R6 612,30

Fikile's salary now covers all his expenses, with a credit balance of R6 930 – R6 612,30 = R317,70 left over.

2. a. Saving of R1 500 per month × 10 = R15 000 cost of new equipment
R15 000 + 12% increase = R16 800
Jocelyn needs to save an extra R1 800.

b. Jocelyn will need to save for an extra two months to afford the equipment at the new price.

c. The price of the equipment will increase again in the next two months.

3. a. Weekly wage: R25,60 per hour is about the same as his income × 35
= R896,00
His expenditure is about the same as his income (R896,00).
R896 + 7,5% = R963,20
Increase in weekly wage: R963,20 ÷ 35 = R27,52
His pay must increase by R27,52 per hour.

b. R963,20 ÷ R25,60 per hour = 37,625
Rounded up to 38 hours per week
Zuban will need to work an extra three hours.

3.2 **Investigation:** Compile a basket of goods table for your household

Learner's Book page 237

Answers will differ.

3.3 **Practice** comparing rates of price change

Learner's Book page 238

1.

	Item	Old price	New price	Percentage increase	Rank (lowest to highest)
a.	Electricity tariff	R0,6160/kWh	R0,8194/kWH	33,02	5
b.	Taxi fare	R5 per trip	R5,50 per trip	10	3
c.	Flat screen television	R4 599	R4 299	–6,52	2
d.	Movie ticket	R12,50	R16,50	32	4
e.	Apples	R11,25 per kg	R6,80 per kg	–39,56	1

2. a. June to September: $\frac{\text{R15,40} - \text{R12,10}}{\text{R12,10}} \times 100\% = 27{,}3\%$

b. January to June: $\frac{\text{R12,10} - \text{R14,50}}{\text{R14,50}} \times 100\% = -16{,}6\%$

June to December: $\frac{\text{R18,65} - \text{R12,10}}{\text{R12,10}} \times 100\% = 54{,}1\%$

From June to December there was the highest increase.

c. January to April: $\frac{\text{R9,95} - \text{R14,50}}{\text{R14,50}} \times 100\% = -31{,}38\%$

3. January to December: $\frac{\text{R18,65} - \text{R14,50}}{\text{R14,50}} \times 100\% = 28{,}6\%$

3.4 **Assignment:** Analyse how inflation rates differ for different food items

Learner's Book page 238

Answers will differ.

Learner's Book page 241

1. a. September 2010 to January 2012

b. Administered prices has the highest rate of inflation for the period.

c. Public transport

d. Public transport

e. Food

f. i. February 2011

ii. June 2011

2. a. Answers will differ.

b. January 1992 to September 1993, January 1995 to January 1996, January 1997 to January 1998, January 1999 to January 2000

c. Answers will differ.

d. i. Most different: January 1991 to January 1996

ii. Most similar: January 1997 to September 2001

3. a. The annual inflation rate and the growth rate for house prices are compared.

b. Answers will differ.

c. About 37%

In 1981, house prices were growing at an annual rate of 37% p.a.

d. The rate of inflation for house prices declined for the period 2004 to 2008.

e. 1992: R450 000
1993: R450 000 + 5% = R472 500
1994: R472 500 + 7% = R505 575
The house would have been worth between R472 500 and R505 575 if sold in 1994.

f. Answers will differ.

4. a. i. Jan 2009: R5,70
Oct 2011: R10,24

$$\frac{\text{R10,24} - \text{R5,70}}{\text{R5,70}} \times 100\% = 79{,}649\% \approx 80\%$$

ii. Jan 2009: R6,40
Oct 2011: R9,45

$$\frac{\text{R9,45} - \text{R6,40}}{\text{R6,40}} \times 100\% = 47{,}66\% \approx 48\%$$

b. Jan 2010: R7,78
June 2010: R8,00

$$\frac{\text{R8,00} - \text{R7,78}}{\text{R7,78}} \times 100\% = 2{,}83\% \approx 3\%$$

c. Jan 2010: R6,76
June 2010: R7,49

$$\frac{\text{R7,49} - \text{R6,76}}{\text{R6,76}} \times 100\% = 10{,}80\% \approx 11\%$$

The diesel price rose at a higher rate over the period.

d. Answers will differ.

1. Single loan

Year	Capital amount	Interest	Closing balance
1	R36 000,00	R3 024,00	R39 024,00
2	R39 024,00	R3 278,02	R42 302,02
3	R42 302,02	R3 553,37	R45 855,39

Total interest paid: R9 855,39

Three separate loans (fully paid back at end of each year)

Year	Capital	Interest	Closing balance
1	R12 000	R1 008	R13 008
2	R10 500	R882	R11 382
3	R13 500	R1 134	R14 614
			R39 024

Total interest paid: R3 024

The three separate loans option is a much cheaper option for Luvuyo.

2. **a.** 35 months

b. **i.** between 16,7% and 30%

ii. between R143 185 and R170 139

c. R1 000

d. Answers will differ.

3. **a.** Interest calculated monthly/quarterly/half-yearly

b,c. Answers will differ.

3. **d.**

Interest calculated	Interest rate	Interest earned	Closing balance
Monthly	4,20% (0,35% per month)	R2 186,73	R27 186,73
Quarterly	4,20% (1,05% per quarter)	R2 178,82	R27 178,82
Half-yearly	4,20% (2,1% per half-year)	R2 185,80	R27 167,08
Annually	4,28%	R2 185,80	R27 185,80
On expiry	4,37%	R1 092,50	R26 092,50

Investing the R25 000 at a rate of 4,2% with interest calculated monthly, or at a rate of 4,28% with interest calculated annually will give the largest closing balance.

e.

Interval at which interest is compounded (months)	Growth of first investment (R16 000) with interest compounded quarterly at 4,4% p.a	Growth of second investment (R16 000) with interest compounded annually at 4,48% p.a.
0	R16 000,00	R16 000,00
3	R16 176,00	
6	R16 353,94	
9	R16 533,83	
12	R16 715,70	R16 716,80
15	R16 899,57	
18	R17 085,47	
21	R17 273,41	

Interval at which interest is compounded (months)	Growth of first investment (R16 000) with interest compounded quarterly at 4,4% p.a	Growth of second investment (R16 000) with interest compounded annually at 4,48% p.a.
24	R17 463,42	R17 465,71
27	R17 655,52	
30	R17 849,73	
33	R18 046,07	
36	R18 244,58	R18 248,18

The second investment of R16 000, where interest is compounded annually, grows slightly better than the first investment of R16 000 where interest is compounded quarterly.

4. If Mervyn invests the money in a fixed deposit, reinvests the money every 36 months (and takes a one-year investment in the final year), he would receive a total of R224 000,18 (assuming interest rates for the fixed deposit remain unchanged).

The amount is less than the minimum amount given for the retirement annuity.

$R39\,700 \times (\frac{100 + 6,4}{100})^{27} \times (\frac{100 + 5,69}{100})$

= R224 000,18

5. **a.** She pays back the whole debit balance three days after the due date.

Month	Opening balance	Purchases	Payments	Interest	Closing balance
June	–	5 997,52		112,45	6 109,97
July	6 109,97	12 962,38	6 109,97	243,04	13 205,42
August	13 205,42	5 601,05	13 205,42	105,02	5 706,07
September	5 706,07	11 778,55	5 706,07	220,85	11 999,40

b. She pays 75% of the debit balance by the due date.

Month	Opening balance	Purchases	Payments	Interest	Closing balance
June	–	5 997,52	4 498,14	28,11	1 527,49
July	1 527,49	12 962,38	10 867,40	67,92	3 690,39
August	3 690,39	5 601,05	6 968,58	43,55	2 366,41
September	2 366,41	11 778,55	10 608,72	66,30	36 602,54

c. She pays off the whole debit balance every second month.

Month	Opening balance	Purchases	Payments	Interest	Closing balance
June	–	5 997,52		112,45	6 109,97
July	6 109,97	12 962,38	19 072,35	0	–
August	–	5 601,05		105,02	5 706,07
September	5 706,07	11 778,55	17 484,62	0	–

6. **a.** The stokvel consists of 11 people who each contribute R60 a month. Each member, therefore, contributes R660 in one year and receives this amount at the end of the year.

b.

Month	Opening balance	Contribution	Interest earned	Closing balance
1	0	R600	R1,60	R601,50
2	R601,60	R600	R3,20	R1 204,80
3	R1 204,80	R600	R4,81	R1 809,61
4	R1 809,61	R600	R6,43	R2 416,04
5	R2 416,04	R600	R8,04	R3 024,08
6	R3 024,08	R600	R9,66	R3 633,74
7	R3 633,74	R600	R11,29	R4 245,03
8	R4 245,03	R600	R12,92	R4 857,95
9	R4 857,95	R600	R14,55	R5 472,50
10	R5 472,50	R600	R16,19	R6 088,69
11	R6 088,69	R600	R17,84	R6 706,53
12	R6 706,53	R600	R19,48	R7 326,01

c. R7 326,01 ÷ 10 members = R732,60

7. a. A homeowner could increase the monthly bond repayments and reduce the rate of interest.

b. Answers will differ.

8. a. R6 990,98

b. Total interest (20 years): R927 835,20
Total interest (15 years): R659 704,20

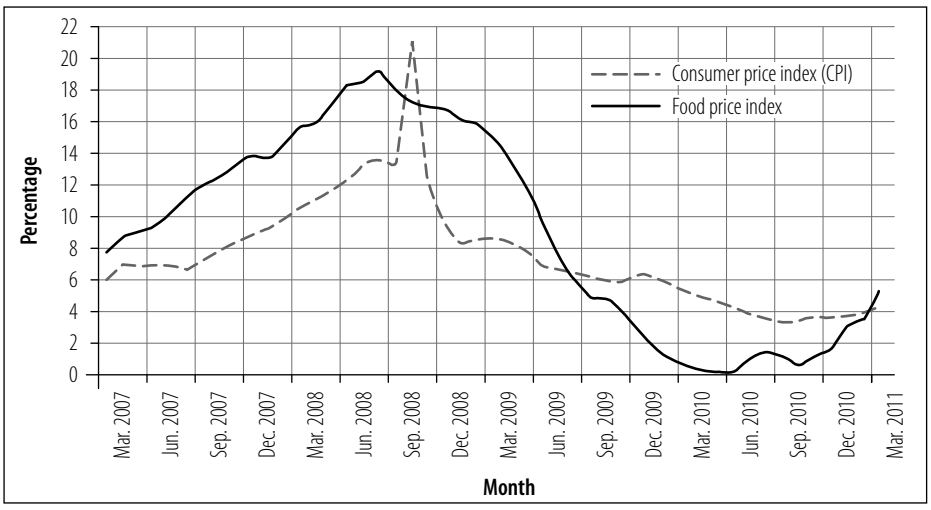
The homeowner would save:
R927 835,20 – R659 704,20
= R268 131,00 in interest

c. Total cost of loan at 9,2% over 15 years: R1 385 368,20
Total cost of loan at 9,2% over 20 years: R1 642 732,80

9. a.

Year	Consumer price index	Food price index	Difference: CPI – FPI
2007	7,1%	10,4%	–3,3%
2008	11,5%	16,7%	–5,2%
2009	7,1%	9,3%	–2,2%
2010	4,3%	0,8%	3,5%
2011	5,0%	7,2%	–2,2%

b.



c.

Year	Opening amount	Average inflation rate	Inflationary amount	Closing amount	Purchasing power
2007	R7 452,00	7,1%	R529,09	R7 981,09	93,37%
2008	R7 981,09	11,5%	R917,83	R8 898,92	83,74%

On 1 January 2009, Mrs Jooste's salary had the purchasing power of 88,74% of her salary in January 2007.

d. In January 2009, her salary increased by 8,3% to R8 070,52.
The purchasing power of her salary was then:
$\frac{\text{R8 070,52}}{\text{R8 898,92}} \times 100\% = 90{,}69\%$

e. R3 500 + 0,8% = R3 528
The Mohole family needed to spend an extra R28 per month.

f. R3 500 + 7,2% = R3 752
or, R3 528 + 7,2% = R3 782,02

Unit 4
Scale

Learner's Book pages 251–258

Teaching tips

- This unit helps to revise and apply the concepts that learners developed in Grade 10 and Grade 11.
- This year, learners are expected to express scale as a unitary ratio (in the form of 1: another number), so it is important that you revise the basic concepts of equivalent ratios and simplifying ratios before tackling this topic. You can find examples in the basic skills section of the Learner's Book (pages 513 and 514).
- Make sure the learners are able to measure distances on maps and convert them to real distances before you ask them to work with real distances and draw their own scaled diagrams. The revision tasks in the Learner's Book can be used to do this.
- In order to make it easy to manage this unit, some real lengths are given. However, it will be more interesting and engaging if you let the learners measure real distances at school and use these to developed scaled diagrams of school buildings. They can work in groups and use a long measuring tape (the industrial type).

Solutions

4.1 **Practise** working out distances using a map scale

Learner's Book page 252

1. a. 60 mm = 60 km
10 mm = 10 km
1 cm = 10 km

b. 40 mm = 144 km
10 mm = 36 km
1 cm = 36 km

c. 40 mm = 120 m
10 mm = 30 m
1 cm = 30 m

d. 40 mm = 140 m
10 mm – 35 m
1 cm = 35 m

2. a. 120 000 mm = 120 m

b. 3 cm = 30 mm × 120 000 mm
= 3 600 000 mm
= 3,6 km

c. 12,5 cm × 120 000
= 1 500 000 cm
= 15 km

d. 38,25 cm × 120 000 = 4 590 000 cm
= 45,9 km

3. a. 29 mm × 150 = 4 350 mm
= 4,35 m
= 0,00435 km

b. 29 mm × 1 500 = 43 500 mm
= 43,5 m
= 0,0435 km

c. 29 mm × 15 000 = 435 000 m
= 435 m
= 0,0435 km

d. 29 mm × 150 000 = 4 350 000 mm
= 4,35 km

e. 29 mm × 1 500 000 = 43 500 000 mm
= 43,5 km

f. 29 mm × 15 000 000 = 435 000 000 mm
= 435 km

g. 29 mm × 150 000 000 = 4 350 000 000 mm
= 4 350 km

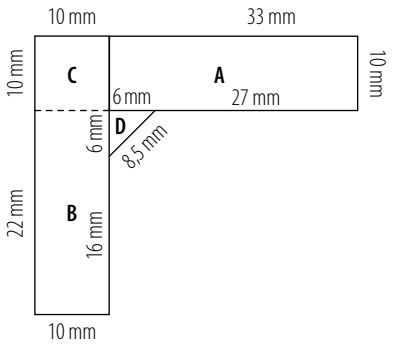
4. a. Length: 68 mm ÷ 10 mm × 0,8 m
= 5,44 m (internal measurement)

Width: 49 mm ÷ 10 mm × 0,8 m
= 3,92 m (internal measurement)

b. 13 mm ÷ 10 mm × 0,8 m
= 1,04 m
= 104 cm

c. Diameter = 14 mm
14 mm ÷ 10 mm × 0,8 m
= 1,12 m
= 112 cm

d.



Length of rectangle A: 33 mm ÷ 10 mm × 0,8 m = 2,64 m
Length of rectangle B: 22 mm ÷ 10 mm × 0,8 m = 1,76 m
Width of rectangles A and B: 10 mm ÷ 10 mm × 0,8 m = 0,8 m

Length of sides of square C: 10 mm ÷ 10 mm × 0,8 m = 0,8 m
Height of triangle D: 6 mm ÷ 10 mm × 0,8 m = 0,48 m
Base of triangle D: 6 mm ÷ 10 mm × 0,8 m = 0,48 m

Surface area of desk:
Area of A + area of B + area of C + area of D
$= (2{,}64 \times 0{,}8\text{ m}) + (1{,}76 \times 0{,}8\text{ m}) + (0{,}8 \times 0{,}8\text{ m}) + \frac{1}{2}(0{,}48 \times 0{,}48\text{ m})$
$= 2{,}112 + 1{,}408 + 0{,}64 + 0{,}1152$
$= 4{,}2752\text{ m}^2$

4.2 **Practise** measuring map distances and working with scale

Learner's Book page 252

1. Answers will differ.

2. **a.** Distance on map: 10 mm
10 mm × 15 000 000
= 150 000 000 mm
= 150 km

b. 4 mm × 15 000 000
= 60 000 000 mm
= 60 km

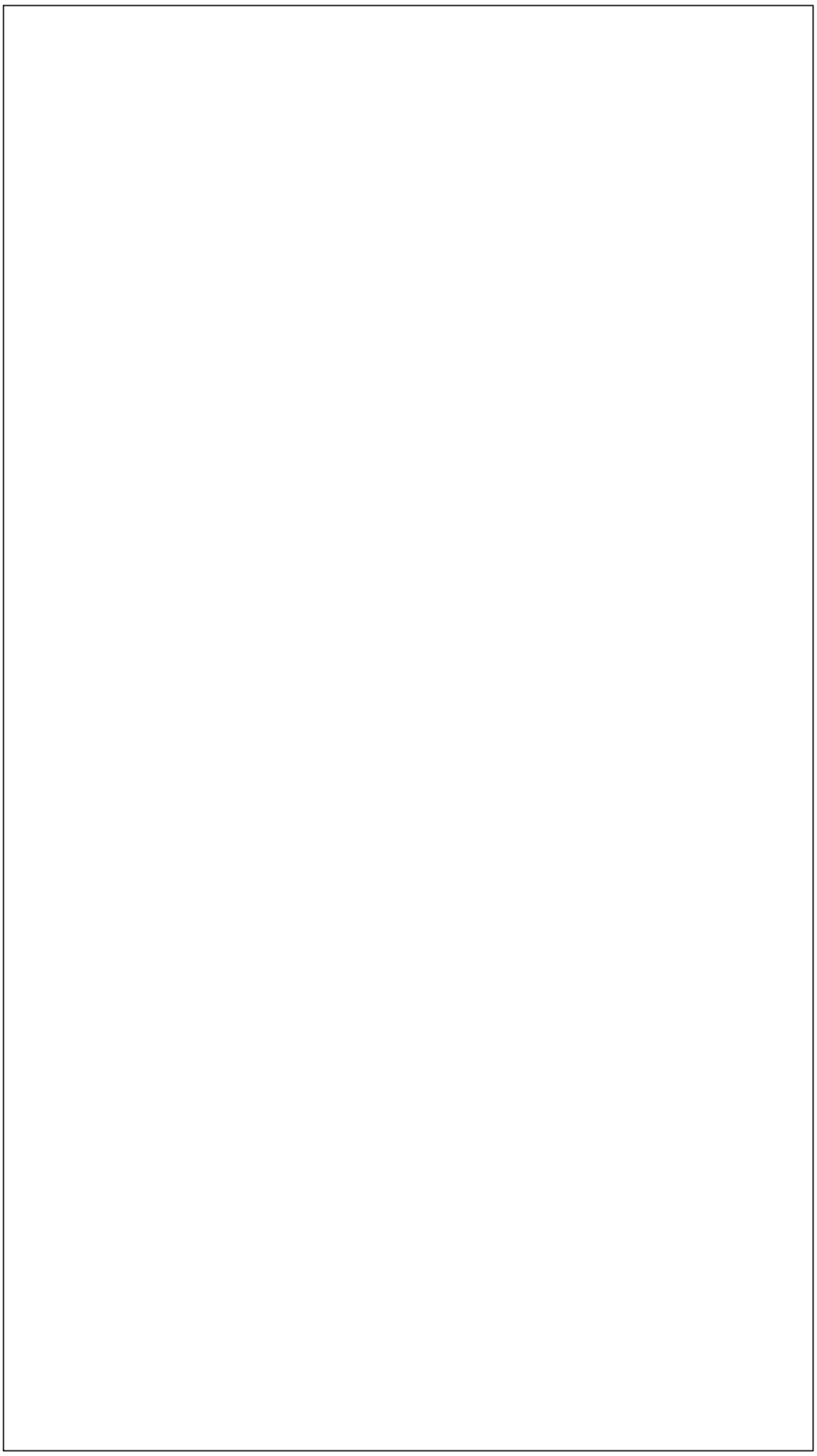
c. 23 mm × 15 000 000
= 345 000 000 mm
= 345 km

d. 17 mm × 15 000 000
= 255 000 000 mm
= 255 km

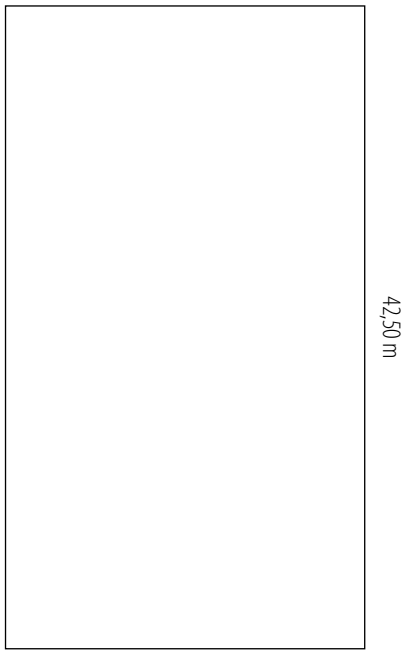
4.3 **Practise** using real distances to calculate measurements on a plan

Learner's Book page 254

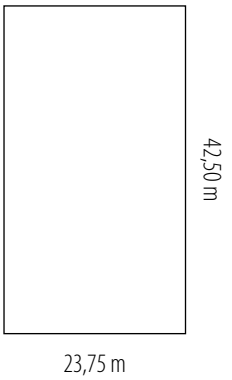
1. a. 1 : 200



b. 1 : 500



c. 1 : 1000



2. Answers will differ.

4.4 **Practise** determining scale in the form of a ratio

Learner's Book page 255

1. **a.** 15 mm = 10 m
15 mm = 10 000 mm
Map scale: 1 : 667

b. 13 mm = 1 km
13 mm = 1 000 000 mm
1 = 76 923,07
Map scale: 1 : 76 923

2. **a.** 6,1 cm = 312 cm
1 = 51,15
Scale: 1 : 51

b. 6,7 cm = 1,68 m
6,7 cm = 168 cm
1 = 25,07
Scale: 1 : 25

c. 98 mm = 3 714 mm
1 : 37,89
Scale: 1 : 38

3. 65 mm = 48,75 km
65 mm = 48 750 000 mm
1 : 750 000

4.5 **Practise** determining scale and using it to determine dimensions

Learner's Book page 257

1. (Using suggestion for scale)

a. 90 mm = 900 m
90 mm = 900 000 mm
1 : 10 000

b. 98 mm × 10 000 = 980 000 mm
= 0,98 km

c. 32 mm + 12,5 + 5 = 49,5
≈ 50 mm
50 mm × 10 000 = 500 000 mm
= 0,5 km

d. 50 mm × 10 000 = 500 000 m
= 0,5 km
Approximately 550 m

e. Leaners discuss estimations.

2. a. 1 cm = 20 km
1 cm = 2 000 000 cm
1 : 2 000 000

b.

	Distance in centimetres (cm) on map	Distance in km
Start – Station 1	4	80
Station 1–2	3,3	66
Station 2–3	2	40
Station 3–4	5,7	114
Station 4–5	5,7	114
Station 5–6	2,5	50
Station 6–7	2	40
Station 7–8	5,5	110
Station 8 – finish	5,8	116

c. 730 km

d. Time = $\frac{\text{distance}}{\text{speed}}$
= $\frac{730 \text{ km}}{45 \text{ km/h}}$
= 16,22 hours
= 16 hours 13 minutes 12 seconds

3. a. 730 km ÷ 6 km/ℓ = 121,67 ℓ

b. 121,67 ÷ 90 ℓ = 1,35
The vehicle would need 2 tanks of petrol.

c. Answers will differ.

Unit 5
Maps

Learner's Book pages 259–282

Teaching tips

- In this unit, learners are expected to apply and combine the skills they already have to work with a range of plans and maps in different contexts. Much of the learning is assumed and you may need to check that learners remember how to read and interpret different types of map and other information before you introduce them to the tasks.
- Learners have worked with floor plans and simple maps before. In this unit, they will work with the same kinds of maps in different contexts. They will also learn how to read and interpret street maps with an index and grid system, maps that show larger areas (maps of South Africa) and elevation maps (also called cross sections).
- It will be useful to have floor plans of local shopping centres. You may find such floor plans at the information kiosks at the centres. Use these

floor plans to revise the basic skills of locating places on a map. Working with maps of places that are familiar to the learners can help them formalise their spatial and mapping abilities.

- Street maps books of your province are also a useful classroom resource as they have maps of small areas and they also contain a detailed index to place names that you can refer to as you work through the unit. Learners can make up activities for each other to complete using local area maps.
- At this level learners are expected to work with compass directions when they are giving or interpreting directions. This topic should not be difficult for learners at all as they have previously used compass directions (also in Social Studies and last year when working with elevations).
- At the very least, you should have an atlas available in class for the learners to use. Remind them that atlas maps tend to show north at the top and that they can work out the other directions when they know where north is.
- The most common use of road maps is probably to find your way while driving. Make sure the learners understand how to read the distance indicators on these maps. They may be presented in different ways by different publishers.
- If someone has access to a GPS system, use it to show the class how maps and routes appear on these systems. The distances given by the GPS are exact, and it could be a fun activity to compare these with distances given on a map.
- Make sure that learners remember and understand that a profile or elevation map is like a line graph that shows distance (in kilometres) on the horizontal axis and height (in metres usually) on the vertical axis. The height (or altitude) is often given on both sides of the graph to make it easier to read the values.

Solutions

5.1 **Practise** describing the positions of places on a map

Learner's Book page 259

1. **a.** Add the number of seats in one long row.

$19 + (9 \times 23) - [17 - (7 + 1) + 17 - (6 + 1)]$
$= 19 + 207 - (9 + 10)$
$= 207$ seats

b. Starting at entrance 2, go to the fourth row from the back. This is row G. Seat G19 is the fifth seat from the right.

c. The sound and lighting box is positioned at the back of the theatre between seats I7 and J6 on the left and I17 and J17 on the right.

d. G1

e. Rows A, I and J have fewer seats.

Rows I and J have fewer seats because of the position of the sound and ligting box. There are fewer seats in row A so that the audience in this row can see more of the stage.

f. Seat number 12 or less for rows B to J. Seats 10 or less for row A.

2. Instructions will differ. Learners can check each other's work.

3. **a.** The suburb Silvamonte is shown on grid DU 109 on page 58 of the map book.

b. Grid EB86, page 126

c. There are two Similane Streets on page 176 with similar grid references (EN 113 for Ncala and EM 113 for Skozona).

d. Simmonds Street runs across Park Central, Braamfontein and Johannesburg.

e. Yes. Germiston and Simmerfield is at grid DX 115 on page 111 and Simmerfield is also on grid DX 113 on the same page.

4. a. It is located in DU 100 between Simmonds Street and Loveday Street.

b. The Civic Centre

c. Botswana

d. The National School of the Arts is at the T-junction where Simmonds Street joins Hoofd Street.

e. The Witwatersrand University's East Campus is northeast of the Joburg Theatre on Jan Smuts Avenue.

f. i. DS 100

ii. DU 99

iii. DS 99

g. Escombe Avenue

h. i. 4

ii. M1

iii. Parktown Boys' High School

i. No, Nisha cannot take the first right into Hoofdt Street. It is a one-way street.

5.2 **Practise** using a street map

Learner's Book page 263

1. Drive south on Jan Smuts Avenue. Turn left into Ameshoff Street. Continue along Ameshoff Street and turn left in to Simmonds Street. The Joburg Theatre is on your right.

2. Sandile should walk north along Rissik Street. He should turn left into Viljoen Street and turn right into Station Street. Rosebank College is on the right.

3. Sandile should walk west along Kotze Street. He should turn left into Joubert Street and follow it as it turns to the right and become De Korte Street. Sandile should walk north along Rissik Street. He should turn left into Viljoen Street and turn right into Station Street. Rosebank College is on the right.

4. a. Approximately 8 000 m

b. Approximately 7,3 km

c. 200 m × 100 m = 20 000 m^2
(The scale is approximately 10 cm : 1 km, thus 1 : 10 000.)

5.3 **Practise** working with compass directions

Learner's Book page 265

1. a. North

b. West

c. East

d. North and then west along Kudu Crescent, and turning south into the parking area

2. a. If the shops are on Main Street, then Andile is facing south. If the shops across Ndlovu Drive are to Andile's right, he is facing north.

b. East

c.

From	To	Direction
Post office	Petrol station	East
Petrol station	Mosque	North
Mosque	School	Southwest
School	Community health centre	Northeast
Church	Post office	Southeast

4. Answers will differ.

5. **a.** Paul Roux

b. Excelsior

c.

From	To	Direction
Armenia Dam	Allemanskraal Dam	North
Allemanskraal Dam	Erfenis Dam	Southwest
Bethlehem	Buthu-Buthe	South
Maseru	Bethlehem	Northeast
Verkeerdevlei	Brandfort	Northwest

5.4 **Practise** reading and making sense of different maps

Learner's Book page 267

1. 50 mm = 2 850 km
1 mm = 57 km
1 mm = 57 000 000 mm
1 : 57 000 000

2. $s = \frac{d}{t}$ 3 h 50 min. = 3,833 h

$= \frac{2\,850 \text{ km}}{3{,}833 \text{ h}}$

= 743,5 km/h

3. East-southeast (ESE)

4. 1 cm = 5 km
1 cm = 500 000 cm
1 : 500 000

5. The map of Africa

6. The map of Mauritius

7. **a.** Southeast

b. Approximate distance: 3 cm on map
So, 15 km

c. Time $= \frac{\text{distance}}{\text{speed}}$

$= \frac{15 \text{ km}}{45 \text{ km/h}}$

= 0,33 h

= 18 min.

8. **a.** Departure time – 2 h – time to travel to the airport
9:15 a.m. – 2 h – 18 min.
= 6:57 a.m.

b. Departure time 9:15 (Mauritius time)
Flight duration 3:50
Arrival time 13:05 (Mauritius time)
Arrival time 11:05 (SA time)

5.5 **Practise** planning and budgeting for a trip

Learner's Book page 268

1. a. 7 532 × 3,5569 = 26 790,57 rupees
b. 26 790,57 + (26 790,57 × 0,26%)
= 26 790,57 + 69,66
= 26 860,23
c. 0,28114 : 1

2. a. Durban is much cheaper than the other cities.
b. About $111 per day
c. $111 × R8,64 = R959,04
d. R959,04 × 3,5569 = 3 411,21 rupees

3. a. (4 × 3) + (16 × 4) = 76 seats
b. rows 5–20
c. seats 5A–5D
d. 5A or 5D
e. Answers will differ.

4. a. Seat 9D is 12 rows from the back, where the toilet (lavatory) is located. Seat 9D is on the starboard side of the plane (on the right when facing forward). The bathroom is at the back on the port (left side when facing forward).
b. Seat 9D is in the 9th row from the front of the aeroplane.
c. The nearest emergency exits are located on either side of the aircraft at the front of the cabin.

5.6 **Practise** working with directions and distances

Learner's Book page 270

1. a–c. Answers will differ.
d. South

2. a. 29,1 km **b.** 23 min.
c. 0,3 km **d.** 12 km

3. a. The ICC is west of Snell Road.
b. Pierre will see the beach front and the ocean.
c.
- Head south on Snell Road.
- Take first right into OR Tambo Parade.
- At the roundabout, turn left into KE Masinga Road.
- Turn left into Sylvester Ntuli Road.
- Turn right in Bram Fisher Road.
- Carry on straight along Bram Fisher Road.
- The hotel is on the right.

d. Drive in an easterly direction past the Sahara stadium, Kingsmead on your left. Turn right into Florence Nzama Street and right into Bram Fisher Road. The ICC is on your left.

5.7 **Practise** working with strip maps

Learner's Book page 273

1. a–c. Answers will differ.
d. Map A

2. a. 130 km **b.** 545 km – 210 km = 335 km
c. 439 km **d.** Kokstad; Brook's Nek

3. a.

Durban–Port Shepstone	280 km
Port Shepstone–Port St Johns	251 km
Port St Johns–N2	112 km
Umtata–East London	245 km
East London–PE	259 km
	1 147 km

b. Time $= \frac{\text{distance}}{\text{speed}}$

$= \frac{1\ 147\ \text{km}}{95\ \text{km/h}}$

$= 12{,}07\ \text{h}$

$= 12\ \text{h}\ 4\ \text{min.}\ 12\ \text{s}$

c.

Departs Durban	5:00
Duration to East London*	9:21
Coffee break	0:30
Lunch break	1:15
	16:06

* Time to get to East London: 1 147 km – 259 km = 888 km

$\frac{888\ \text{km}}{95\ \text{km/h}} = 9{,}35\ \text{h} = 9\ \text{h}\ 21\ \text{min.}$

Pierre arrives in East London at 16:06.

d. $\frac{259\ \text{km}}{100\ \text{km/h}} = 2{,}59\ \text{h}$

$= 2\ \text{h}\ 35\ \text{min.}\ 24\ \text{s}$

4. a. 1 147 km ÷ 12,5 km/ℓ = 91,76 ℓ

b. 91,76 ℓ × R11,85/ℓ = R1 087,36

c. R297 × 2 = R594

5. Renting a car

Rental	R594,00
Petrol	R1 087,36
	R1 681,36

Return flight: R3 294 ÷ 2 = R1 647 for a single ticket

Travelling by car	R1 681,36
Travelling by aeroplane	R1 647,00
	R34,36

It costs R34,36 more to travel from Durban to Port Elizabeth in a hired car.

6. a.

Arrival	14:55
Departure	13:35
Flight duration	1:20

$\frac{687\ \text{km}}{1{,}333} = 515{,}38\ \text{km/h}$

1 h 20 min. = 1,333 hours

b. Driving distance along the N2: 964 km
Flying distance: 687 km
The flying distance is 277 km shorter than the driving distance.
The driving distance as calculated for question 3(a): 1 147 km
The flying distance is also 460 km shorter than the distance of 1 147 km.

7. Answers will differ.

5.8 **Practise** interpreting route and elevation maps

Learner's Book page 276

1. a. Answers will differ. It is about 1 : 250 000.

b. Answers will differ. It is about 60 km.

c. Answers will differ. It would take about 3 h 20 min. if the route is 60 km.

2. Answers will differ.

3. **a.** 113 km
b. 350 m
c. Answers will differ.

4. **a.** Mostly level
b. Uphill
c. There are three pairs of uphill and downhill sections.
d. Mostly level

5. Answers will differ.

6. Answers will differ.

7. **a.** Answers may differ, the example is based on the answer to question 1(b) and a distance of 60 km.

Pierre: $\frac{60 \text{ km}}{13 \text{ km/h}} = 4{,}615 \approx 4 \text{ h } 36 \text{ min. } 54 \text{ s}$
$\approx 4 \text{ h } 37 \text{ min.}$

Cousin: $\frac{60 \text{ km}}{31{,}5 \text{ km/h}} = 1{,}905 \approx 1 \text{ h } 54 \text{ min. } 20 \text{ s}$

b. Pierre's cousin would finish first. She would wait almost two hours and 43 minutes for Pierre to finish.

c. The example answer is based on a distance of 60 km.
2 h 29 min. = 2,483 h
Speed = $\frac{60 \text{ km}}{2{,}48 \text{ h}} = 24{,}16$ km/h
This is slower than the cousin's speed; it is quite slow.

Revise and consolidate

Learner's Book page 280

1. **a.** 30 mm
b. 15 mm
c. 40 mm
d. 45 mm
e. 10 mm

2. **a.** **a.** 100 km
b. 50 km
c. 133,33 km
d. 150 km
e. 33,33 km

b. **a.** 37,5 km
b. 18,75 km
c. 50 km
d. 56,25 km
e. 12,5 km

c. **a.** 90 000 mm = 90 m
b. 45 000 mm = 45 m
c. 120 000 mm = 120 m
d. 135 000 mm = 135 m
e. 30 000 mm = 30 m

d. **a.** 9 000 000 mm = 9 km
b. 4 500 000 mm = 4,5 km
c. 12 000 000 mm = 12 km
d. 13 500 000 mm = 13,5 km
e. 3 000 000 mm = 3 km

3. **a.** **i.** 67,5 km
ii. 290 km
b. **i.** North east
ii. South west

4. 40 mm : 150 km
40 mm : 150 000 000 mm
1: 3 750 000
a. approximately 260 km
b. 2 h 45 min. = 2,75 h ($\frac{45}{60} = \frac{3}{4} = 0{,}75$)
$\frac{260 \text{ km}}{2{,}75 \text{ h}} = 95$ km/h

c. Answers will differ.
Using the distance estimated in question 4(a):
260 km ÷ 8 km/ℓ = 32,5 ℓ

d. R11,85 × answer from question 4(c):
R11,85 × 32,5 ℓ = R385,13

5. a. Answers depends on answer in question 4(c).
An example is given below.
6,68 × R11,85 + 19,25c + 9,35c
= 79,158c/km + 28,6c/km
= 107,758c/km
≈ 108c/km

b. Answers will differ.
An example is R1,08/km.

c. Answers will differ.
An example is R1,08 + 12,5% × R1,08 = R1,21/km.

d. Answers will differ.

6. a. Elevation maps

b. Route 1: 9 km
Route 2: 19 km

7. a. 506 m
b. 558 m
c. 510 m
d. 558 m – 506 m = 52 m

8. a. Going uphill
b. Cycling on level ground
c. Going downhill
d. Going uphill

Unit 6
Measuring length and distance

Learner's Book pages 283–300

Teaching tips

- Learners have been developing their skills at length and distance measurement throughout their schooling, so in this Grade 12 unit, the emphasis is on more complex applications of these skills in a variety of contexts.
- The first section of the unit focuses on estimation skills – learners should develop a systematic approach to length estimation, rather than relying on random guesses in different situations. The examples set out in the Learner's Book can be augmented or replaced with appropriate examples from a local context. For example, the estimation of street length can be replaced by an estimation of a given distance between two landmarks on a street, farm or other familiar environment.
- Estimation, calculation and costs are also linked in this unit. Learners will do many activities in later measurement units that involve costing materials needed for building projects. The practice work they do in this unit to estimate and calculate the costs of different lengths or distances will give them an opportunity to revise skills they will need to apply later in the course.
- Compiling a travel logbook and a travel budget for tax or business purposes is an opportunity to revise content that was first introduced in

Grade 11, and that is referred to again in later measurement units and also in relation to income tax in the unit on taxation in Term 3.

- There are various opportunities in this unit for learners to practise and extend their skills at reading diagrams and plans, in order to calculate materials needed for construction projects. Reading maps is also involved in the interpretation of information relating to contexts such as distances travelled and internet connections.

Solutions

6.1 **Practise** estimating lengths and costs

Learner's Book page 289

1,2. Answers will differ.

3. a. Estimated gap between trees:
146,4 m ÷ (16 + 2 trees) = 8,13 m per tree
1 000 m ÷ 8,13 m = 123 trees

b. 2 400 ÷ 8,13 m = 295,20 ≈ 295 trees

c. (295 trees × 90 minutes per tree ÷ 60 minutes × R100/h)
+ (R349,99 per tree × 295 trees)
= R44 250 + R103 247,05
= R147 497,05

4. 146,4 m ÷ 10 m = 14,64
= 14 benches

5–8. Answers will differ.

6.2 **Practise** estimating and calculating lengths

Learner's Book page 295

1. a. Length: 29 cm
Width: 39 cm

b. Leg lengths: 70 cm (height) + 5 cm (handles) – 5 cm (height of castors)
= 70 cm
Height of castors: 5 cm

c. 39 cm

d. Sides must be 29 cm apart.
Length of supporting bars: 28 cm

e. Legs: 70 cm each
Side bars: 28 cm each
Handles: 38 mm each
(4 × 70) + (6 × 28) + (2 × 38)
= 280 + 168 + 76
= 524 cm

f,g. Answers will differ.

2. a.

Section	Cupboard	Width
Solid panel	1 and 2	250 mm
Solid panel	3	200 mm
Glass doors	2	250 mm
Solid doors	1	350 mm
Solid doors	2 and 4	250 mm
Solid doors	3	300 mm

b. i. Wood for cupboard doors:
(350 mm + 4 × 250 mm) length × 500 mm width
= 1 350 mm × 500 mm piece of wood

Cupboard panels:
4 panels × 250 mm width × 500 mm height
= 1 000 mm × 500 mm
or 2 500 mm × 2 000 mm piece of wood

ii. Glass doors: 250 mm width × 500 m height × 3 doors
= 500 mm × 750 mm sheet of glass

c–g. Answers will differ.

6.3 **Practise** reading and interpreting information about Internet connections around Africa

Learner's Book page 298

1. It connects Melkbosstrand and Mtunzini. It is larger than the other cables.

2–4. Learners discuss and explain their answers.

5. Terabits/gigabits

6–8. Learners discuss their answers.

6.4 **Investigation:** What does a road cost?

Learner's Book page 300

Answers will differ.

Unit 7
Measuring mass

Learner's Book pages 301–319

Teaching tips

- In this unit, learners continue the work they did in Grade 10 and Grade 11 using a variety of scales to measure small and large masses. A focus of this unit is the body mass of adults and children, and learners do a variety of activities to monitor body mass in relation to accepted norms of adult and child health.
- The body mass index (BMI) weight status categories are the focus of a group of activities that involve gathering and organising mass data for adults. Learners calculate the BMI of a few adults, and then monitor and compare the weight status of different groups of adults, based on the BMI data collected for people in each group.
- The body mass of children is monitored with reference to the *Road to health chart* for very young children and BMI charts for older children. Learners read and interpret these charts, using their skills at reading graphs. They then do an investigation to monitor the growth patterns of children using data they collected.
- Mass measurement is related to health concerns in the section on food, nutrient mass and body mass. Learners interpret information about mass given on food packaging, and critically assess a news report about food and body mass.

- Calculating the cost of food portions by mass is the focus of the next section. Learners calculate the costs of food portions and the prices that must be set to give a desired percentage profit. They apply these methods to developing a healthy daily diet for young children and calculating the cost of such a diet.
- The relationship between mass and cost is also investigated in the contexts of postal and air freight tariffs for parcel transport.
- Choosing a combination of masses to achieve a target mass is the focus of the section on packing for lightweight travel.
- The skills of calculating correct dosage in relation to mass are applied in the contexts of medicine dosage and pest control ingredients.

Solutions

7.1 **Practise** using the BMI to determine weight status

Learner's Book page 302

1.

	Name	Average mass (kg)	Height (m)	BMI	Weight status
a.	Lucien	72,3	1,76	23,34	Normal
b.	Tshepiso	61,5	1,55	25,60	Overweight
c.	Noor	69,2	1,89	19,37	Normal
d.	Hein	58,5	1,48	26,71	Overweight
e.	Zodwa	54,6	1,70	18,89	Normal

2–4. Answers will differ.

7.2 **Practise** reading and interpreting charts for young children

Learner's Book page 305

1. a. Length: 51 cm
Weight: 3,2 kg
b. 25%
c. True
d. Yes, Zuki's height is within the curves on the chart, even though she is very tall for her age.
e. Answers will differ.
f. 8,4 kg
g. Zuki is tall and thin. She is the 90th percentile for height, but below the 25th percentile for weight.

2. a. Maria has a low birth weight. Her birth weight is in the 10th percentile.
Reason: Answers will differ.
b. Her growth rate in the first six months was slow, growing at a rate equal to that of the bottom two percentiles.
c. Her weight declined and is now outside of the normal curves.
d. No, she is not developing normally. Her height and weight are below the length-for-age and weight-for-age percentiles.

7.3 **Practise** reading and interpreting data about body mass and BMI

Learner's Book page 309

1. a. 15,6 BMI
b. 15,3 BMI

2. a. $\frac{46{,}4\text{ kg}}{(1{,}54\text{ cm})^2} = \frac{46{,}4}{2{,}3716} = 19{,}56$

b. He is above the median for his age (17,8) and is close to the 75th percentile for his age. His BMI is greater than average for his age.

3. a. Anita is close to the 90th percentile. Her BMI is more than that of almost 90% of the girls in her age group.

b. She is overweight and needs to lose some weight.

4. 25th percentile

5.

Learner	Gender	Age	Height (m)	Mass (kg)	BMI	Classification
Selina	F	12	1,38	25	13,13	underweight
Bhuthi	M	18	1,49	61	27,47	overweight
Koos	M	15	1,47	46	21,29	normal
Nomi	F	15	1,47	46	21,29	normal
Naadira	F	16	1,54	72	30,36	obese
Thabiso	M	16	1,72	72	24,34	normal
Andrea	F	18	1,65	66	24,24	normal

7.4 **Practise** reading information about nutrients in lists and tables

Learner's Book page 314

1. Egg yolk (6 g in one large egg)

2. You should include eggs in a sugar-free diet. They do not contain sugar.

3. There is no cholesterol in egg white. Egg yolk is high in cholesterol.

4. Percentage of protein in chicken × weight of piece of chicken
= 30% × 100 g
= 30 g
A 100 g slice of chicket contains 30 g of protein.

5. Pork

6. Chicken

7.

Cheese	per 100 g	per 200 g	Percentage of RDA of 44%	Percentage of RDA of 88% (200 g)
Energy	1 660 kJ	3 320 kJ		
Protein	24,8 g	49,6 g	93%	186%
Carbohydrates	1,4 g	2,8 g	5%	10%
Total fat	33 g	66 g	125%	250%
Total dietary fibre	0 g	0 g	0%	0%
Sodium	574 mg	1,148 g	0,0002%	0,0004%

8. Cheese

7.5 **Practise** reading and interpreting a report about body mass

Learner's Book page 314

1. Regular chocolate consumption was correlated to lower BMI.

2. It is the composition of the calories, not the number of calories, that is more important.

3,4. Answers will differ.

1. a.

Ingredient	Cost/kg	Mass per portion	Cost per portion
Hake	R39,95	150 g	R5,99
Potatoes	R12,30	180 g	R2,21
Cooking oil	R18,90	75 g	R1,42
Total			**R9,62**

b.

Ingredient	Cost/kg	Mass per portion	Cost per portion
Pizza dough	R21,45	200 g	R4,29
Cheese	R56,20	80 g	R4,50
Tomatoes	R15,85	120 g	R1,90
Total			**R10,69**

c.

Ingredient	Cost/kg	Mass per portion	Cost per portion
Frozen peas	R32,00	75 g	R2,40
Onions	R8,45	10 g	R0,08
Mint leaves	R42,60	5 g	R0,21
Dried vegetable stock	R14,80	10 g	R0,15
Total			**R2,84**

2. a. i. Fish and chips
Cost + 12% × cost
= R9,62 + 12% × R9,62
= R10,77

ii. Pizza margherita
R10,69 + 12% × R10,69
= R11,97

iii. Pea soup
R2,84 + 12% × R2,84
= R3,18

b. i. Fish and chips
Cost + 22,5% × cost
= R9,62 + 22,5% × R9,62
= R11,78

ii. Pizza margherita
R10,69 + 22,5% × R10,69
= R13,10

iii. Pea soup
R2,84 + 22,5% × R2,84
= R3,48

c. i. Fish and chips
R9,62 + 60% × R9,62
= R15,39

ii. Pizza margherita
R10,69 + 60% × R10,69
= R17,10

iii. Pea soup
R2,84 + 60% × R2,84
= R4,54

3. VAT rate = 14%

a. i. Fish and chips
R10,77 + 14% × R10,77
= R12,28

ii. Pizza margherita
R11,97 + 14% × R11,97
= R13,65

iii. Pea soup
R3,18 + 14% × R3,18
= R3,63

b. i. Fish and chips
R11,78 + 14% × R11,78
= R13,43

ii. Pizza margherita
R13,10 + 14% × R13,10
= R14,93

iii. Pea soup
R3,48 + 14% × R3,50
= R3,97

c. i. Fish and chips
R15,39 + 14% × R15,39
= R17,54

ii. Pizza margherita
R17,10 + 14% × R17,10
= R19,49

iii. Pea soup
R4,54 + 14% × R4,54
= R5,18

7.7 Assignment: Compile a table of medicine dosages for paracetamol

Learner's Book page 319

Answers will differ.

Unit 8
Measuring volume

Learner's Book pages 320–333

Teaching tips

- In this unit, learners apply methods they learned in previous grades to a range of contexts in which volumes must be calculated, measured and combined in different ratios.
- In the context of craft activities, they must read instructions involving ratios, volumes and costs to calculate the quantities and costs of materials for different projects.
- In the context of environmental concerns about water consumption, learners interpret and critically compare research data about the volume of household water consumption. They then use data about dam capacity to calculate the volume of water available per person in a South African city. You can augment or adapt this activity by using data from your region about the volume of water in the dams that serve this region. Local dam volumes and capacities are given in newspapers from time to time, or you can consult the website of the Department of Water Affairs (www.dwa.gov.za).
- Learners calculate the run-off rate of rainwater in a whole neighbourhood – this is an extension of an activity done in Grade 11 to calculate run-off rates for individual roofs.
- The last section of the unit focuses on monitoring concentrations of substances in liquids. Learners interpret information about the *E coli* bacterium, and do calculations using information about how to disinfect water that may be contaminated with *E coli*. They also use communication skills to prepare a set of instructions about this disinfection method for people who do not speak English, or are not able to read English easily.

Solutions

8.1 **Practise** calculations with volumes and the costs of materials

Learner's Book page 324

1. a. She needs 0,5 ℓ.
5 ℓ = 20 m^2
ratio: 1 ℓ : 4 m^2
0,5 ℓ : 2 m^2
0,125 ℓ : 0,5 m^2
= 125 ml : 0,5 m^2

i. Transparent glaze

Item	Parts	Quantity
Transparent enamel	2	$\frac{2}{4}$ × 125 ml = 62,5 ml
Purified linseed	1	$\frac{1}{4}$ × 125 ml = 31,25 ml
Turpentine oil	1	$\frac{1}{4}$ × 125 ml = 31,25 ml
Artist's oil paint		A few squeezes

ii. Scumble glaze

Item	Parts	Quantity
Eggshell enamel	2	$\frac{2}{5}$ × 125 ml = 50 ml
Boiled linseed oil	2	$\frac{2}{5}$ × 125 ml = 50 ml
Mineral turpentine	1	$\frac{1}{5}$ × 125 ml = 25 ml
Tinter's/artist's oil paint		A few squeezes

iii. Water-based glaze

Item	Parts	Quantity
PVA paint	2	$\frac{2}{5}$ × 125 ml = 50 ml
Water	2	$\frac{2}{5}$ × 125 ml = 50 ml
Commercial glazing coat	1	$\frac{1}{5}$ × 125 ml = 25 ml

iv. Milk varnish

Item	Parts	Quantity
Matt varnish	1	$\frac{1}{2}$ × 125 ml = 62,5 ml
Mineral	1	$\frac{1}{2}$ × 125 ml = 62,5 ml
White eggshell enamel		A small amount

b. Living room size: 20 m^2
Scumble glaze required: 5 ℓ

Item	Parts	Quantity
Eggshell enamel	2	$\frac{2}{5} \times 5\ \ell = 2\ \ell$
Boiled linseed oil	2	$\frac{2}{5} \times 5\ \ell = 2\ \ell$
Mineral turpentine	1	$\frac{1}{5} \times 5\ \ell = 1\ \ell$
Tinter's/artist's oil paint		A small quantity

c. Bedroom size: 7,5 m^2
Transparent glaze required: 1,875 ℓ

Item	Parts	Quantity
Transparent enamel	2	$\frac{2}{4} \times 1\ 875$ ml = 937,5 ml
Purified linseed	1	$\frac{1}{4} \times 1\ 875$ ml = 468,75 ml
Turpentine oil	1	$\frac{1}{4} \times 1\ 875$ ml = 468,75 ml
Artists' oil paint		A small quantity

d. Answers will differ.

3. Answers will differ.

4. **a.** 400 ml mug + 10% × 400 ml
= 440 ml
Aysha can round off the size of the mug to 450 ml.

b. 750 ml bowl + 10% × R750 ml
= 825 ml
Aysha can round off the size of the bowl to 850 ml.

c. **i.** 6 mugs × 450 ml capacity per mug ÷ 1 000 ml × 500 g clay
= 1 350 g clay
= 1,35 kg clay

ii. 6 bowls × 850 ml capacity per bowl ÷ 1 000 ml × 500 mg clay
= 2 550 g clay
= 2,55 kg clay

8.2 **Practise** interpreting statistics about water consumption

Learner's Book page 326

1–3. Answers will differ.

8.3 **Practise** calculating volumes of water available per person in a city

Learner's Book page 327

1. 898 300 Ml (megalitre)

2. 898 200 000 000 ℓ ÷ 3 750 000 people
= 239 546,67 ℓ

3,4. Answers will differ.

5.

Dam	Capacity	Percentage capacity	Actual volume of water
1	58 644 Ml	49,4	28 970,1 Ml
2	33 517 Ml	42,3	14 177,7 Ml
3	31 767 Ml	49,7	15 788,2 Ml
4	164 122 Ml	45,1	74 019 Ml
5	480 250 Ml	54,1	259 815,3 Ml
6	130 000 Ml	59,7	77 610 Ml

6. 470 380,3 Ml

7. 470 380 300 000 ℓ ÷ 3 750 000 people
= 125 434,7 ℓ

8.4 **Assignment:** Calculate the run-off rate of rainwater for a whole neighbourhood

Learner's Book page 328

Answers will differ.

8.5 **Practise** using information about concentrations of liquids

Learner's Book page 332

1. a. Safe

b. Safe

c. 500 parts per 1 000 ℓ
= 50 parts per 100 ml
This mixture is safe.

d. Unsafe

e. 1 000 000 parts per kl
= 1 000 000 parts per 1 000 ℓ
= 1 000 000 parts per 1 000 000 ml
= 1 part per 1 ml
The mixture is safe.

2. a. 50 ℓ container × 1 drop per litre (7% to 10% chlorine in the bleach)
= 50 drops of bleach
50 ℓ of water are required.

b. 50 ℓ container × 10 drops of bleach per litre = 500
You need 500 drops of bleach.

c. 50 ℓ container × 1 drop per litre = 50
You need 50 drops of bleach.

d. 35 ℓ × 10 drops of bleach per litre = 350
You need 350 drops of bleach.

e. 35 ℓ × 10 drops of bleach per litre × 2 = 700
You need 700 drops of bleach.

f. It will take 30 minutes for the water that is brown to be purified.

Unit 9
Measuring temperature

Learner's Book pages 334–339

Teaching tips

- This unit begins with calculations with temperature information, and converting between temperatures in degrees Fahrenheit and degrees Celsius in the context of weather. Learners then use temperature information to plan a journey; this involves using other available information to judge whether a given temperature is given in Celsius or Fahrenheit.
- The next section of the unit, focuses on interpreting temperature information concerning the safe storage of food. Measurement: Assignment 5 gives learners the opportunity to measure temperatures in their home fridges, and plan food storage accordingly. If there are learners in your class who do not have fridges at home, adapt the activity as a whole so that the class measures temperatures in a fridge at the school or in a suitable home environment (to avoid causing embarrassment among learners whose homes are not suitably equipped for the activity).

Solutions

9.1 **Practise** calculating with temperature information

Learner's Book page 335

1. Temperatures for Los Angeles and Mexico City are in Fahrenheit; the rest are in Celsius.

2. **a.** summer
b. winter

3,4. Temperatures are rounded off to the nearest integer.
48 °F = 9 °C
55 °F = 13 °C
77 °F = 25 °C
86 °F = 30 °C

9.2 **Investigation**: Use temperature information to plan a journey

Learner's Book page 336

Answers will differ.

9.3 **Practise** interpreting information about freezer storage of foods

Learner's Book page 339

1.

Type of food	Number of months food item can be stored in freezer
Cooked food	1–2
Ice cream	1–2
Puddings	1–2
Fish	3–4
Bread	3–4
Cheese	5–6
Vegetables (onions)	5–6

Type of food	Number of months food item can be stored in freezer
Processed or convenience food	5–6
Lamb	7–8
Pizza	7–8
Duck	7–8
Chicken	9–10
Vegetables (mushrooms, carrots)	9–10
Rabbit	9–10

2. Answers will differ.

Unit 10
Calculating perimeter, area and volume

Learner's Book pages 340–372

Teaching tips

- The first section revises concepts and methods for finding perimeter, area and volume using accurate measurement and estimation. Learners should already be familiar with the methods used, and in this section, they practise achieving accuracy in measurements to levels suitable for different contexts.
- They then revise methods for using formulae to calculate perimeter, area and volume, and apply these methods to composite shapes.
- The next sections of the unit apply these methods in diverse practical contexts to find the quantities of materials needed and calculate the costs of these materials. Contexts include laying carpeting on a floor, tiling a given area, finding the surface area of a roof, and calculating quantities of material needed for small structures used on farms.
- Throughout these sections, learners build up a set of methods that they apply later in the unit to more complex investigations into the quantities and cost of building materials for a small house and a budget for a children's play park.
- The section on housing density introduces learners to this concept, and guides them through a calculation of housing density in the area where they live. In the investigation in this section, you should decide on a suitable location for learners to study. They should be able to go door to door in a street collecting data, and also make contact with local municipal planning officers who can talk to them about housing density policy in the area they investigate.

Solutions

10.1 **Practise** accurate measurements to millimetre, centimetre and metre accuracy levels

Learner's Book page 345

1–4. Answers will differ.

10.2 **Practise** measuring and calculating perimeter, area, surface area and volume

Learner's Book page 350

1. a. i. $P = (2 \times w) + (\frac{1}{4} \times 2\pi r) + r + l$
$= (2 \times 0{,}5\text{ m}) + (\frac{1}{4} \times 2 \times 3{,}142 \times 2\text{ m}) + 2\text{ m} + 2\text{ m}$
$= 1\text{ m} + 3{,}142\text{ m} + 4\text{ m}$
$= 8{,}142\text{ m}$

ii. $A = (l \times b) + (\frac{\pi r^2}{4})$
$= (2\text{ m} \times 0{,}5\text{ m}) + (\frac{3{,}142 \times 2\text{ m}^2}{4})$
$= 1\text{ m}^2 + 3{,}142\text{ m}^2$
$= 4{,}142\text{ m}^2$

b. i. $P = (\frac{3}{2}\pi r) + (2s)$
$= \frac{3}{2}(3{,}142 \times 74\text{ cm}) + 2(74\text{ cm})$
$= 348{,}762\text{ cm} + 148\text{ cm}$
$= 496{,}762\text{ cm}$

ii. $A = \frac{3}{4}\pi r^2 + s^2$
$= \frac{3}{4} \times 3{,}142 \times (74\text{ cm})^2 + (74\text{ cm})^2$
$= 12\,904{,}194\text{ cm}^2 + 5\,476\text{ cm}^2$
$= 18\,380{,}194\text{ cm}^2$

c. i. $P = \frac{3}{2}\pi r + 9{,}9\text{ cm}$
$= \frac{3}{2} \times 3{,}142 \times 7\text{ cm} + 9{,}9\text{ cm}$
$= 42{,}891\text{ cm}$

ii. $A = \frac{3}{4}\pi r^2 + \frac{1}{2}h \times b$
$= (\frac{3}{4} \times 3{,}142 \times 7^2) + (\frac{1}{2} \times 7 \times 7)$
$= 115{,}4685 + 24{,}5$
$= 139{,}9685\text{ cm}^2$

d. i. $P = 4(\frac{1}{2} \times 2\pi r) + (8 \times 9)$
$= 4(\frac{1}{2} \times 2 \times 3{,}142) + 72$
$= 113{,}112 + 72$
$= 185{,}112\text{ m}$

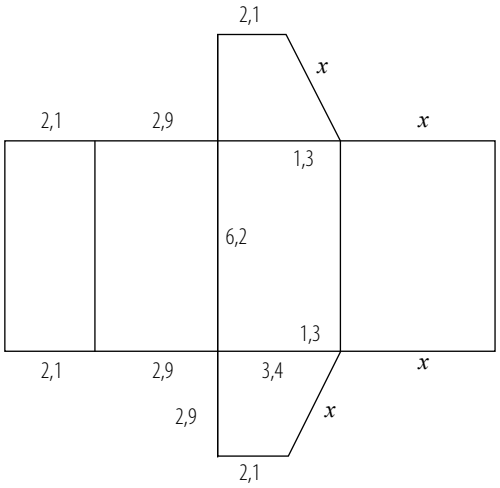
ii. $A = s^2 - 2\pi r^2$
$= 36^2 - 2 \times 3{,}142 \times 9^2$
$= 1\,296 - 509{,}004$
$= 786{,}996\text{ m}^2$

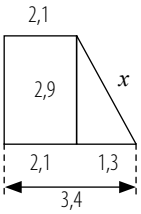
2. a. i. $V = lbh$
$= 82\text{ cm} \times 16\text{ cm} \times 40\text{ cm}$
$= 52\,480\text{ cm}^3$

ii. Surface area $= 2lh + 2lb + 2hb$
$= 2 \times 82 \times 40 + 2 \times 82 \times 16 + 2 \times 16 \times 40$
$= 10\,464\text{ cm}^2$

b. i. $V = lbh + \frac{1}{2}lbh$
$= 6{,}2 \times 2{,}1 \times 2{,}9 + \frac{1}{2} \times 6{,}2 \times 2{,}9 \times (3{,}4 - 2{,}1)$
$= 49{,}445\text{ m}^3$

ii. Surface area





$2{,}9^2 + 1{,}3^2 = x^2$
$8{,}41 + 1{,}69 = x^2$
$10{,}1 = x^2$
$3{,}178 = x$
$x = 3{,}178$

Surface area
$= 2{,}1 \times 6{,}2 + 2{,}9 \times 6{,}2 + 3{,}4 \times 6{,}2 + 6{,}2 \times 3{,}178 + 2(2{,}9 \times 2{,}1 + \frac{1}{2} \times 1{,}3 \times 2{,}9)$
$= 13{,}02 + 17{,}98 + 21{,}08 + 19{,}7036 + 2(6{,}09 + 1{,}885)$
$= 71{,}7836 + 15{,}95$
$= 87{,}7336 \text{ cm}^2$

c. i. $r = 58 \div 2 = 29$ cm
$V = \pi r^2 h$
$= 3{,}142 \times (29)^2 \times 5$
$= 13\,212{,}11 \text{ cm}^3$

ii. Surface area $= 2\pi r\,(r + h)$
$= 2 \times 3{,}142 \times 29 \times (29 + 5)$
$= 182{,}236 \times 34$
$= 6\,196{,}024 \text{ cm}^2$

d. i. $r = 2{,}5 \div 2 = 1{,}25$
$V = \frac{1}{2} \pi r^2 h$
$= \frac{1}{2} \times 3{,}142 \times 1{,}25^2 \times 7{,}9$
$= 19{,}392 \text{ m}^2$

ii. Surface area $= \frac{1}{2} 2\pi r\,(r + h)$
$= \frac{1}{2} \times 2 \times 3{,}142 \times 1{,}25 \times (1{,}25 + 7{,}9)$
$= 3{,}9275 \times (9{,}15)$
$= 35{,}94 \text{ m}^2$

3. a. Surface areas of 4 sides
$= 2(2 \times 0{,}08) + 2(1 \times 0{,}08)$
$= 4{,}8 \text{ m}^2$

b. Small triangle on top, a circle, a square, a long triangle below
Each square = 100 cm^2: 10 cm × 10 cm
12 blocks per row in each square
∴ the sides of each block are 10 cm ÷ 12 = 0,833 cm

Surface area $= \frac{1}{2} lh + \pi r^2 + s^2 + \frac{1}{2} lh$
$= (\frac{1}{2} [4 \times 0{,}833] \times [2 \times 0{,}833]) + [3{,}142 \times (2 \times 0{,}833)^2]$
$+ (4 \times 0{,}833)^2 + [\frac{1}{2} (4 \times 0{,}833 \times 6 \times 0{,}833)]$
$= (1{,}666 \times 1{,}666) + 8{,}720797 + 11{,}102224 + 8{,}3266668$
$= 30{,}925245 \text{ cm}^2$

c. Surface area of inner diamond:

$2 \times \frac{1}{2} \times 4 \times 0{,}833 \times 2 \times 0{,}833$

$= 5{,}551112 \text{ cm}^2$

Total surface area	$30{,}925245 \text{ cm}^2$
Blue tiles	$5{,}551112 \text{ cm}^2$
Green tiles	$25{,}374133 \text{ cm}^2$

d,e. If 10 cm blocks:

1 m ÷ 10 cm = 100 cm ÷ 10 cm = 10 blocks

If 8 cm blocks × 0,833 blocks = 6,664 cm

1 m ÷ 6,664 cm = 15,006 blocks

≈ 15 blocks

There are 15 patterns along the short side of the fishpond.

Along the side with a length of 2 m:

2 m ÷ 6,664

= 30

There are 30 patterns along the side of the pond.

f–h. Answers will differ.

4. Answers will differ.

10.3 **Practise** finding perimeter, area, surface area and the volume of real objects with composite shapes

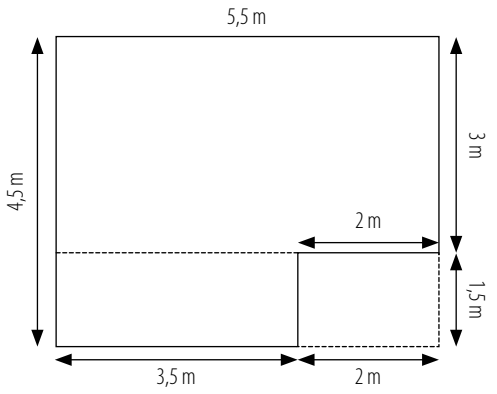
Learner's Book page 352

Answers will differ.

10.4 **Practise** calculating quantities and costs of materials

Learner's Book page 358

1. a.



Single piece of carpet

$A = l \times b$

$= 5{,}5 \text{ m} \times 4{,}5 \text{ m}$

$= 24{,}75 \text{ m}^2$

Unused area of carpet

$A = 2 \text{ m} \times 1{,}5 \text{ m}$

$= 3 \text{ m}^2$

Two pieces of carpet; no wasted carpet

$A = l \times b + l \times b$

$= 5{,}5 \text{ m} \times 3 \text{ m} + 3{,}5 \text{ m} \times 1{,}5 \text{ m}$

$= 16{,}5 \text{ m}^2 + 5{,}25 \text{ m}^2$

$= 21{,}75 \text{ m}^2$

If a customer wants a single piece of carpet:
Options: Coir @ R330/m^2
Acrylic @ R194/m^2
The area is 24,75 m^2
The unused area is 3 m^2

Cost of coir: 24,75 m^2 × R330/m^2 = R8 167,50
Cost of unused carpet: 3 m^2 × R330/m^2 = R990
Cost of acrylic: 24,75 m^2 × R194 m^2 = R4 801,50
Cost of unused carpet: 3 m^2 × R194/m^2 = R582

If the customer accepts having a join in the carpeting
Area of carpeting: 21,75 m^2
Cost of sisal: R295/m^2 × 21,75 m^2 × R6 416,25
Cost of coir: R330/m^2 × 21,75 m^2 = R7 177,50
Cost of acrylic: R194/m^2 × 21,75 m^2 = R4 219,50
Cost of wool: R359/m^2 × 21,75 m^2 = R7 808,25

b. Mrs Jojobe can afford a single piece of acrylic carpet that will fit the whole room. It will cost R4 801,50. The unused piece of carpeting required costs R582,00.

2. a. 5 mm is added to some of the lengths and widths so that material can be folded over the edge of the container (three edges of the box and three edges of the lid) when a folded box is covered. The width of the flaps is estimated to be 8 mm. If the box is folded and glued before it is covered, it is not necessary to include all the flaps when the amount of material is calculated – only the flaps of the lid need to be included. Calculations are then done as follows:

Surface area of rectangle A (no need for flaps on the short side):
110 mm × (32 mm + 5 mm) = 4 070 mm^2

Surface area of rectangle B: 110 mm × 70 mm = 7 700 mm^2

Surface area of rectangle C: 110 mm × 32 mm = 3 520 mm^2

Surface area of rectangle D:
[110 mm + 2(8 mm + 5 mm)] × (70 mm + 8 mm + 5 mm)
= 11 288 mm^2

Surface area of rectangles E and F: 70 mm × (32 mm + 5 mm)
= 2 590 mm^2

Total surface area of box (including three flaps and six sides where 5 mm of the velvet will be folded over the edges):
= 4 070 mm^2 + 7 700 mm^2 + 3 520 mm^2 + 11 288 mm^2 + 2(2 590) mm^2
= 31 758 mm^2
= 317,58 cm^2

(To make the calculation even more accurate, you could subtract 338 mm^2 from the surface area of 31 758 mm^2 (for the square corners of the flaps on the length of the lid as they will be cut off). This will make the total surface area 31 420 mm^2 and change the answer to question 2(b) to 222 boxes and that for question 2(c) to R1,26.)

If the net of the box is covered before it is folded, all the flaps will be covered at the same time. (The flaps are seen as rectangular.) However, if the short sides of some flaps will be diagonal, they can be cut like this before the flaps are covered – this would be four very small surface areas and so the material can simply be folded over these diagonal sides. It is not necessary to subtract these areas from the total amount of velvet that is needed. Calculations for working in this way are as follows:

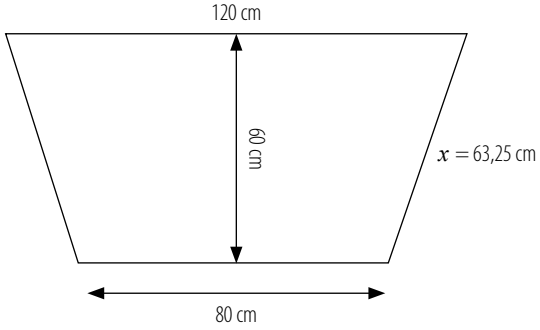
Surface area of rectangle A: 110 mm × (32 mm + 5 mm) = 4 070 mm^2

Surface area of rectangle B: 110 mm × 70 mm = 7 700 mm^2
Surface area of rectangle C: 110 mm × 32 mm = 3 520 mm^2
Surface area of rectangle D:
[110 mm + (8 mm + 5 mm)]× (70 mm + 8 mm + 5 mm) = 11 288 mm^2
Surface area of rectangle E and F:
[70 mm + 2(8 mm + 5 mm)] × (32 mm + 5 mm) = 3 552 mm^2
Total surface area of box (including seven flaps and six sides where 5 mm of the velvet will be folded over – less material can be used to fold over when the net, and not the folded box, is covered with velvet):
[4 070 + 7 700 + 3 520 + 11 288 + 2(3 552)] mm^2
= 33 682 mm^2
= 336,82 cm^2

b. Area of velvet: 5 000 mm × 1 400 mm = 7 000 000 mm^2
Surface area of box: 31 758 mm^2
7 000 000 mm^2 ÷ 31 758 mm^2
= 220,42
≈ 220 boxes
Surface area of net (including all flaps): 33 682 mm^2
7 000 000 mm2 ÷ 33 682 mm^2
= 207,83
≈ 207 boxes

c. R279,50 ÷ 220 boxes = R1,27
Cost of covering one box: R1,27
R279,50 ÷ 207 boxes = R1,35
Cost of covering the net of one box: R1,35

3. a.



$x^2 = 60^2 + (\frac{120 - 80}{2})^2$
$= 60^2 + 20^2$
$= 4\,000$
$x = \sqrt{4\,000}$
$= 63{,}25$ cm
2 × 580 × 63,25 + 2 × (80 × 60 + 60 × 20) + 580 × 80
= 73 370 + 12 000 + 46 400
= 131 770 cm^2
= 13,177 m^2

b. P = 2 × 1,2 m + 2 × 5,8 m
= 14 m
14 m plastic is required per trough.

c. V = *lbh* + *lbh*
= 80 × 60 × 580 + 40 × 60 × 580
= 2 784 000 + 1 392 000
= 4 176 000 cm^3
= 4 176 ℓ

d. 3 480 ℓ ÷ (4 ℓ per day × 15 animals) = 69,6
The farmer can refill once every 69 days.

4. a. Rods: 7 × 10,8 m = 75,6 m

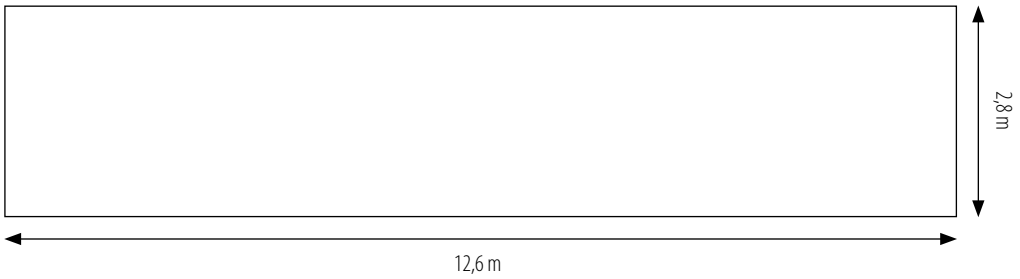
Semicircle:
$P = \pi r$
$= 3{,}142 \times (6 \text{ m} \div 2) = 9{,}426 \text{ m}$

Total length requried:
75,6 m + 2 × 9,426 m
= 94,452 m

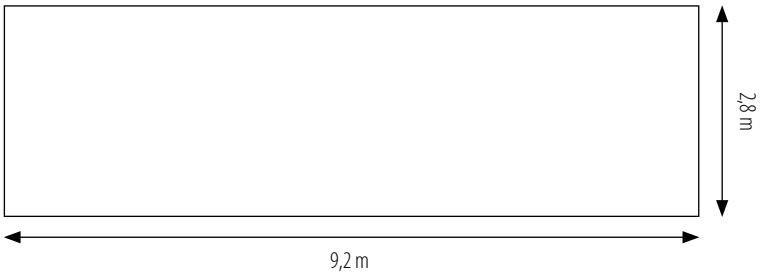
b. $A = \frac{1}{2} \times 2\pi r\,(r + h) + 10\% \left(\frac{1}{2} \times \pi r^2\right)$
$= 3{,}142 \times 3(3 + 10{,}8) + 10\% \left(\frac{1}{2} \times 3{,}142 \times 3^2\right)$
$= 130{,}0788 + 1{,}4139$
$= 131{,}4927 \text{ m}^2$

c–e. Answers will differ.

5. a. Side view



Front/back



b. Area of side wall:
12,6 m × 2,8 m = 35,28 m²

Convert to cm²
= 352 800 cm²

Area of brickface:
25 cm × 5,5 cm = 137,5 cm²
352 800 cm² = 137,5 cm²
= 2 565,82
= 2 566 bricks

Area of front/back wall:
9,2 m × 2,8 m = 25,76 m²

Convert to cm:
257 600 cm² ÷ 137,5 cm²
= 1 873,45
= 1 874 bricks

Bricks required:
2 × 2 566 + 2 × 1 874 bricks
= 8 880 bricks

c,d. Answers will differ.

e. Learners are not expected to redo the calculations in questions 5(b) and (d) to include the mortar, but you could add this as an activity for revision or assessment at a later stage.

6. Answers will differ.

7. **a.** R802
b. R610 + R802 = R1 412
c. Answers will differ.

10.5 **Assignment:** Update a construction budget for a house

Learner's Book page 362

You may want to choose one of the two activities for the class to do; the assignment is a less complex approach than the investigation of the same topic of new house construction costs (Measurement: Investigation 5).

10.6 **Investigation**: Housing density where you live

Learner's Book page 365

Answers will differ.

Revise and consolidate

Learner's Book page 369

1. **a.** Running cost calculation (assume petrol price is R11,70):
Fuel factor + service and repair costs + tyre costs
6,91 × R11,70/ℓ + 17,18 + 9,57
= 107,507
≈ 108c
= R1,08
Fixed cost element: 94c
Total operating cost: R1,08 + 94c = R2,02

b. Running cost:
8,26 × R11,70/ℓ + 19,23 + 16,32
≈ 132,192c
= R1,32
Fixed cost element: 134c
Total operating cost: R1,32 + R1,34 = R2,66

c. Running cost:
6,91 × R11,70/ℓ + 17,09 + 9,57
= 107,507c
= 108c
≈ R1,08
Fixed cost element: 116c
Total operating cost: R1,08 + R1,16 = R2,24

2. Running costs (assume petrol price is R11,70 per litre):
Fuel factor + service and repair costs + tyre costs
= 8,26 + R11,7/ℓ + 19,23 + 16,32
= 132,19c
= R1,32

Total operating costs:
= R1,32 + 4,09
= R5,41

3. a. 8,06 m

b. 8,06 m ÷ 0,5 m = 16,12 = 16
16 support posts are required.

c. Area of patio
5,06 m × 3 m
= 15,18 m^2

Area of tiles + grouting per tile
A = 0,5 m tile + 0,005 m grouting × 0,5 m tile + 0,005 m grouting
= 0,505 m × 0,505 m
= 0,255025 m^2

15,18 m^2 ÷ 0,255025 m^2
= 59,52
= 60 tiles

d. Answers will differ.

e. Total area of floor:
4,2 × 2,56
= 10,752 m^2

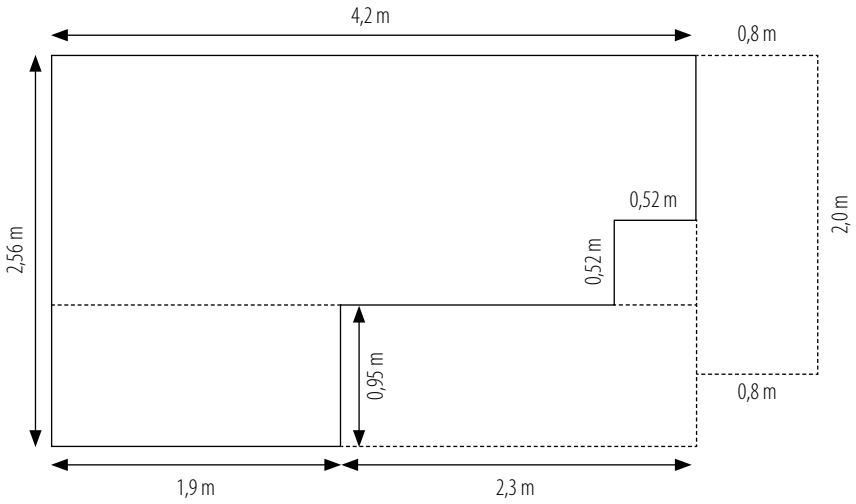
Areas around which to cut carpeting:
0,52 m × 0,52 m
= 0,2704 m^2

2,3 m × 0,95 m
= 2,185 m^2

0,2704 m^2 + 2,185 m^2
= 2,4554 m^2

Total area to be carpeted:
10,752 m^2 – 2,4554 m^2
= 8,2966 m^2

f.



It will be necessary to make joins, as the width of the carpet is only 2 m while the width of the room is 2,56 m.

g. R75 × 8,2966 m^2 = R622,25

4. a. Outside walls
[2,5 m + (2 m + 2,3 m) + 2,5 m + 2,56 m] × 2,7 m – (0,813 × 2,032) m^2
= 30,369984 m^2

Convert 30,369984 m^2 to squared centimetre (cm^2): 303 699,84 cm^2

Area of a brick: 25 cm × 5,5 cm = 137,5 cm^2

303 699,84 cm^2 ÷ 137,5 cm^2
= 2 208,726
= 2 209 bricks

b. Inside walls
(4,2 m + 2,5 m) × 2,7 – 2(0,813 m × 2,032 m)
= 18,09 m^2 – 3,304032 m^2
= 14,785968 m^2

Convert 14,785968 m^2 to squared centimetre (cm^2): 147 859,68 cm^2

147 859,68 cm^2 ÷ 137,5
= 1 075,34
= 1 076 bricks

5. Learners compare answers.

6. a. $V = \pi r^2 h$
$= 3{,}142 \times 45 \text{ cm} \times 160 \text{ cm}$
$= 22\,622{,}4 \text{ cm}^3$

b. Convert to litres:
22 622,4 cm^3 ÷ 1 000 cm^3 = 22,6224 ℓ

22,6224 ℓ × 780 g
= 17 645,472 g
= 17,645472 kg

c. $2\pi r\,(r + h)$
2 × 3,142 × 45 cm (45 cm + 160 cm)
= 57 969,9 cm^2
= 5,79699 m^2

d. The barrel must be coated inside and outside: $\frac{5{,}79699 \text{ m}^2 \times 2}{40 \text{ m}^2}$ = 0,29 packets

e. 0,29 × R849 = R246,21
But the coating is sold in packets of 15 kg at R849 per packet. So, the waterproofing will cost R849.

7. a. Normal weight
b. Obese
c. Normal weight
d. Normal weight

8. a. 4 + 4 + 4 + 3 + 1 = 16 parts
5 kg = 5 000 g
Mass of each part: 5 000 g ÷ 16 = 312,5 g
Linseeds: 4 parts × 312,5 g = 1 250 g
Pumpkin seeds: 4 parts × 312,5 g = 1 250 g
Sunflower seeds: 4 parts × 312,5 g = 1 250 g
White sesame seeds: 3 parts × 312,5 g = 937,5 g
Black sesame seeds: 1 part × 312,5 g 312,5 g

b. 5 000 g seed mix × 30 ml olive or avocado oil ÷ 500 g seed mix
= 300 ml olive or avocado oil

9. a. Fahrenheit
b. 4,4 °C to 15,56 °C
Item should be refrigerated or kept cool.

10. You can cook the fish pie at about 195 °C for 25 minutes and then at 215 °C for 5 minutes to 10 minutes to make the crust crispy (cook at approximately 15 °C hotter).

11. a. 1 920 m^2 = 0,192 ha
One dwelling can be built on 0,192 ha.

b. 16 ÷ 0,192 = 83,33 dwellings/ha
The housing density is 83 dwellings per hectare.

c. 16 houses × 5 people = 80 people per 0,192 ha
80 ÷ 0,192 = 416,67/ha
The housing density is 416 people per hectare.

12. a. 500 houses ÷ 4,4 ha = 113,64 dwellings per hectare
A density of 113,64 dwellings per household is fewer than the municipal limit of 120 dwellings per hectare. However, the development does not satisfy the municipaly's housing policy.

Explanations will differ.

b. Answers will differ.

TERM 3

WORKED ANSWERS

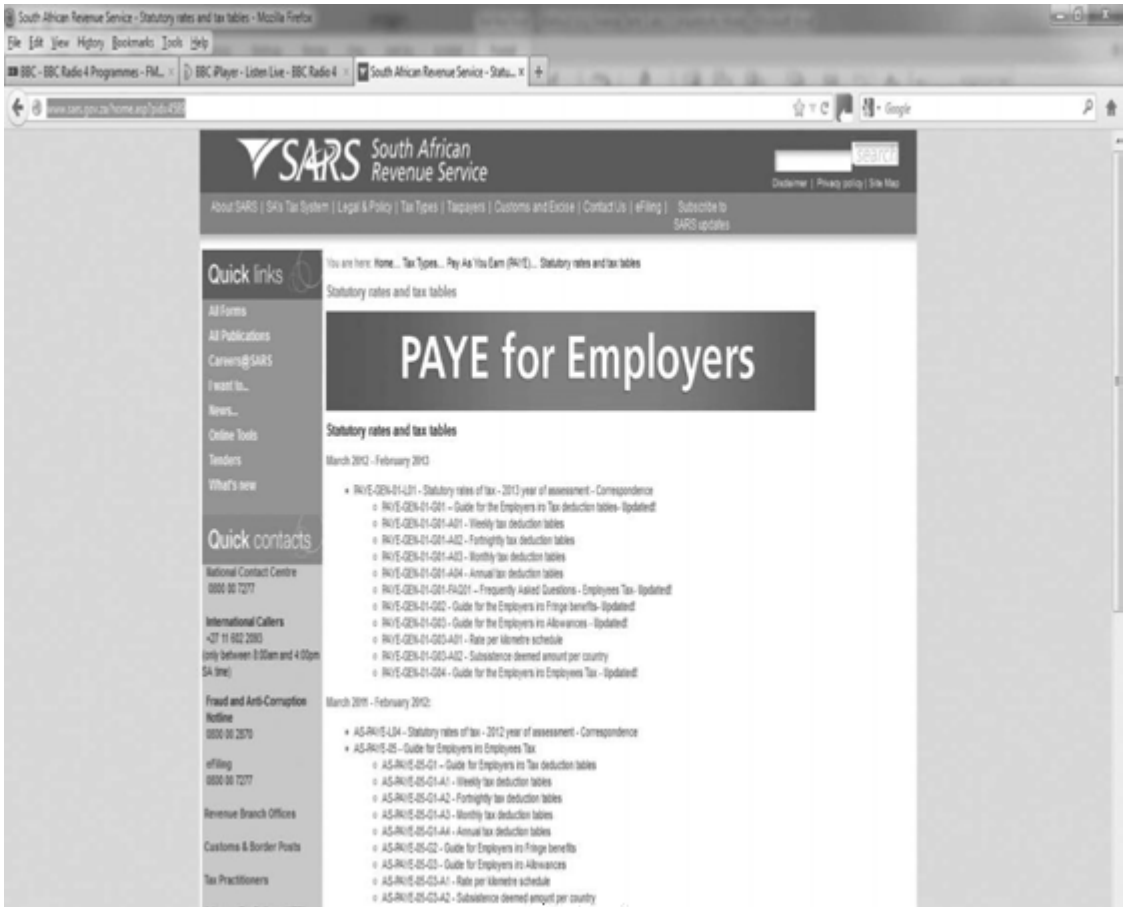
Unit 1
Taxation

Learner's Book pages 374–399

Teaching tips

- In this unit, learners work with three forms of taxation: value-added tax (VAT), contributions to the Unemployment Insurance Fund (UIF), and employee and personal income tax.
- Learners also worked with VAT and UIF in Grade 10 and Grade 11. You can use the first activity to assess their ability to calculate VAT, prices that include VAT and ones that exclude VAT, and understand and calculate the employee and employer contributions to the UIF.
- The remainder of the unit focuses on employee income tax and personal income tax.

  Learners should be able to calculate employee tax, personal income tax and net pay based on information given about gross pay, PAYE, deductions, tax credits and so on. The Learner's Book gives a flow chart and a detailed example to help learners follow the steps in the calculation process. Encourage them to use these guidelines when they do the calculation activities. If they follow the example step by step, they will arrive at the correct tax calculation in each case.
- Learners should also be able to work with weekly, fortnightly and monthly tax tables, as well as the table of tax brackets and formulae to calculate the tax payable on different amounts of taxable remuneration. Detailed examples of these calculations are given in the Learner's Book. You can download the full tax tables for the current year from the SARS website (www.sars.gov.za/home.asp?pid=4589). You could print a few pages from the different tables (or let learners access the tables online) and ask the learners to practise reading off values for different remuneration amounts and payment periods. You will also find more recent tables of tax brackets and formulae on the SARS website (www.sars.gov.za); use these to keep the examples in the activities up to date.
- Learners need to be able to analyse information about income tax on IRP5 forms provided by employers, as well as the SARS IRP5/3T(a) return for employee tax and the ITR12 return for personal income tax. The Learner's Book works through examples of these forms. (The forms can be downloaded directly from the SARS website (www.sars.gov.za).) You can use blank forms to give learners further practice in analysing the forms by filling in details you give them for other examples of employee pay and deductions.



- Understanding tax return terminology is an important prerequisite for working with these documents. The terms used on income tax forms are explained in the Learner's Book, and then used to discuss the methods of calculating income tax. Make sure that learners can interpret and use these terms accurately in the activities in this section.
- Once learners understand how to calculate tax payable on a given amount of taxable income, they should investigate how an increase in pay can affect the amount of tax payable. Ensure that they understand not only the basic calculation method for the new amount of pay, but also the concept that income tax can increase at a higher rate (percentage) than a pay increase, if the pay increase pushes the new taxable income into a higher tax bracket. This is explained in the unit, with reference to examples. If necessary, work though more examples with the learners before they do the activities, to ensure that they grasp this concept fully.

Solutions

1.1 **Practise** doing VAT and UIF calculations

Learner's Book page 377

1. **a.** R688,60 **b.** R109,90
c. R894,90 **d.** R96,40
e. R14 675,44 **f.** R16 730
g. R104 824,56 **h.** R136 230

2. a.

Month	Gross sales income (R)	Income from zero-rated goods (R)	Income from taxable goods (R)	VAT (R)
April	884 301,25	190 445,25	693 856,00	85 210,39
May	901 308,67	198 300,78	703 007,89	86 334,30
June	852 549,40	175 400,35	677 149,05	83 158,66
July	934 210,32	210 207,45	724 002,87	88 912,63
August	912 767,35	187 744,65	725 022,70	89 037,88
September	895 335,20	203 358,30	691 976,90	84 979,62
Total	**5 380 472,19**			**517 633,48**

The supermarket must pay R517 633,47 VAT.

b. Net sales = gross sales income – VAT payable
= R5 380 472,19 – R517 633,48
= R4 862 838,71

3. a. R11 430 × 1% = R114,30
b. R8 005 × 1% = R80,05
c. R29 660 × 1% = R296,60

4. a. R678 × 1% = R6,78

b. R712,50 × 1% = R7,13
R7,13 – R6,78 = R0,35
Lesego's UIF increased by 35c per week.

5. a. Wage of R1 588,50 × 4 weeks × 1% UIF dedution
= R63,54 (for each employee)

Fortnight's wage of R4 550 × 2 fortnights per month × 1% UIF
= R91

Salary of R15 436,80 × 1% UIF
= R154,37

b. 2 × R63,54 + R91 + R154,37
= R372,45

c. Zwelethu's UIF contributions for one year:
(2 × R15,88 × 52 + R45,50 × [52 ÷ 2] + R154,37 × 12)
= R4 686,96

Employer's contribution: R4 686,96

Total UIF contributions
= 2 × R4 686 ,96
= R9 373,92

6. Maximum UIF rate: 58%
R4 355,40 × 58% = R2 526,13
(Every two weeks for a maximum of 288 days.)

Alternative calculation:
A fortnight's wage of R4 335,40, means a monthly wage of R8 710,80.
58% of R8 710,80 = R5 052,26 per month for a maximum of 7,9 months (238 days ÷ 30 days).
The maximum UIF benefit she could receive is about R3 992,85 per month for a period of 238 days.

Or, using the fortnightly wage of R4 335,40:
R4 335,40 ÷ 14 = R311,10 per day
58% × R311,10 = R180,44 per day
She received R180,44 per day for 238 days.

Learner's Book page 386

1. **a.** R341 **b.** R311
c. R317 **d.** R273

2. **a.** The 72-year-old pays more PAYE per month.
A 65-year-old who earns R25 725 per month will pay R4 258 tax per month.
A 72-year-old who earns R25 966 per month will pay R4 335 tax per month.

b. The 27-year-old will have more PAYE deducted from the monthly salary.
The 44-year-old who earns R27 928 will have R5 449 PAYE deduced from the salary.
The 27-year-old who earns R29 005 will have R5 778 PAYE deducted from the montly salary.

c. The 68-year-old will have more PAYE deducted from the monthly salary.
The 51-year-old who earns R24 412 per month will have R4 393 PAYE deducted from the salary.
The 68-year-old who earns R26 412 per month will have R4 457 PAYE deducted from the salary.

3. **a.** R75 401 × 18%
= R13 572,18

b. R28 800 + 25% × (R189 833 – R160 000)
= R36 258,25

c. R128 400 + 38% × (R608 071 – R484 000)
= R175 546,98

d. R128 400 + 38% × (R494 775 – R484 000)
= R132 494,50

e. R51 300 + 30% × (R282 369 – 250 000)
= R61 010,70

f. R80 100 + 35% × (R399 000 – R346 000)
= R98 650

4. **a.** Thabong's monthly taxable income of R27 500 is equivalent to an annual taxable income of R330 000.
His new monthly taxable income of R28 883 is equivalent to an annual taxable income of R346 596.

i. Difference: R346 596 – R330 000 = R16 596
ii. Percentage increase: 5,03%

Income tax payable on a monthly taxable income of R27 500 (or R330 000 p.a.):
R51 300 + 30% of (R330 000 – R250 000)
= R75 300

Income tax payable on an increased monthly taxable income of R28 883 (or R346 596 p.a.):
R80 100 + 35% of (R346 596 – R346 000)
= R80 308,60

i. Difference in income tax payable:
R80 308,60 – R75 300,00 = R5 008,60

ii. Percentage increase in income tax payable:

$$\frac{5\,008{,}60}{75\,300{,}00} \times \frac{100}{1} = 6{,}65\%$$

b. Dorothy's monthly taxable income of R20 325 is equivalent to an annual taxable income of R243 900.

Her new monthly taxable income of R22 459 is equivalent to an annual taxable income of R269 508.

i. Difference: R25 608

ii. Percentage increase:10,5%

Income tax payable on a monthly taxable income of R20 325 (or R243 900 p.a.):
R28 800 + 25% of (R243 900 – R160 000)
= R49 775

Income tax payable on an increased monthly taxable income of R22 459 (or R269 508 p.a.):
R51 300 + 30% of (R269 508 – R250 000)
= R57 152,40

i. Difference in income tax payable:
R57 152,40 – R49 775,00 = R7 377,40

ii. Percentage increase in income tax payable:
$\frac{7\ 377,40}{49\ 775,00} \times \frac{100}{1} = 14,8\%$

c. Jan-Hendrik's monthly taxable income of R51 287 is equivalent to an annual taxable income of R615 444.

His new monthly taxable income of R52 000 is equivalent to an annual taxable income of R624 000.

i. Difference: R8 556

ii. Precentage increase: 1,39%

Income tax payable on a monthly taxable income of R51 287 (or R615 444 p.a.):
R128 400 + 38% of (R615 444 – R484 000)
= R178 348,72

Income tax payable on an increased monthly taxable income of R52 000 (or R624 000 p.a.):
R178 940 + 40% of (R624 000 – R617 000)
= R181 749

i. Difference in income tax payable:
R181 740,00 – R178 348,72 = R3 391,28

ii. Percentage increase in income tax payable:
$\frac{3\ 391,28}{178\ 348,72} \times \frac{100}{1} = 1,9\%$

1.3 **Practise** calculating taxable income and income tax payable

Learner's Book page 389

1. a. Gross income

Annual salary (R34 800 × 12)	R417 600	
Interest on bank account	R15 500	
Car allowance from employer (R500 × 12)	R6 000	
Total gross income		R439 100
UIF contribution (1% of gross salary)	R4 176	
Pension fund contribution (R300 × 12)	R3 600	
Total non-taxable deductions		R7 776
Taxable income		R431 324

b. R80 100 + 35% (R431 324 – R346 000)
= R109 963,40

c.

Total tax payable (according to tax table)	R109 963,40
Subtract primary tax rebate	– 10 755,00
	99 208,40
PAYE deducted by employer 12 × R7 100	–85 200,00
Balance owed by Laureen	R14 008,40

2.

Taxable income	R463 068,00
Total tax payable as per tax tables: R80 100 + 35% (463 068 – 346 000)	R121 073,80
Subtract tax rebate	
Primary tax rebate	R10 755,00
Secondary tax rebate	R6 012,00
Subtract tax credits	
Medical aid for Moeletsi and his wife (R230 each)	R5 520,00
Total tax payable	R98 763,80
PAYE deducted by employer (12 × 3 250)	R39 000,00
Balance tax payable	R59 786,80

3. a. Gross income for year

Annual salary (R9 450 × 12)	R113 400,00	
Housing subsidy from employer (R750 × 12)	R9 000,00	
Total gross income		R122 400,00
Pension fund contribution (R450 × 12)	R5 400,00	
Employee UIF contribution (1% of gross salary)	R1 134,00	
Total non-taxable deductions		R6 534,00
Taxable income		R115 866,00

b. 18% × R115 866 = R20 855,88

c.

Total tax payable on taxable income	R20 855,88
Subtract primary tax rebate	– R5 700
Total tax payable	R15 155,88

d. R834 × 12 = R10 008

e. R5 147,88

4. a. Gross income for the year

Rental income (R16 000 × 12)	R192 000	
Interest on investments	R9 800	
Total gross income		R201 800
Rental expenses (R3 560 × 12)	R42 720	
Total non-taxable deduction		R42 720
Taxable income		R159 080

b. R159 080 × 18% = R28 634,40

c. Tax rebate

Primary tax rebate		R9 900
Tax credits		
Medical aid for Josiah and his dependants		
Josiah: R200 × 12	R2 400	
First dependant: R200 × 12	R2 400	
Second dependant: R144 × 12	R1 728	
Third dependant: R144 × 12	R1 728	
Fourth dependant: R144 × 12	R1 728	
Total tax credits		R9 984

d.

Total tax payable on taxable income	R28 634,40
Subtract primary tax rebate	– R9 900
Subtract tax credits	
Subtract medical aid tax credit	– R9 984
Total tax payable	R8 750

1.4 **Practise** analysing tax forms

Learner's Book page 398

1. **a.** 2011
b. Price Davidson Accountants (Pty) Ltd
c. 12 months of the tax year
d. 12
e. R417 420
f. Pension fund R31 306
Medical aid R16 710
g. R89 037,73
h. R96 456,37

2. Answers will differ.

3. **a.** Gift from daughter to the value of R25 000 and a foreign pension of R87 950
b. No
c. R42 366
d. 16 182 km
e. Fuel and oil of R7 330 + maintenance and repairs of R1 296 + insurance and licence fees of R6 832 + wear and tear of R12 000 = R27 458

4. **a.** R12 569
b. Provisional tax
c. R7 740
d. R572 499
e. R180 124,60
f. R151 405
g. Answers will differ.

Unit 2
Exchange rates

Learner's Book pages 400–417

Teaching tips

- This unit consolidates and extends what learners learned in Grade 11 about the exchange rates that are used to buy foreign currency. The Learner's Book gives a range of examples of exchange rate tables, as published in daily newspapers, on websites and in the foreign currency sections of banks. If possible bring current versions of these tables to class for the learners to use – they can compare the rates in current tables with those in the Learner's Book, and discuss whether the currencies have become stronger or weaker relative to the rand.
- Learners need to be able to use estimation to convert foreign currencies into rand, and rand into different foreign currencies – they do not need to use algebra or accurate calculations to many decimal places. They can do estimation by rounding off an exchange rate to the nearest whole number, or to two decimal places if prices are being given in, for example, dollars and cents. Help learners to develop their estimation skills by doing rapid mental estimations with rates: for example, if US$1 is about R8,50, approximately what does it cost to buy US$10, US$50, and so on?
- Budgeting with foreign currency involves checking how the exchange rate changes for the foreign currency you want to use – learners should develop the habit of comparing exchange rates they used in a previous activity with the exchange rate for the same currency that they find at a later time to see if the currency now costs more or fewer rand. The Learner's Book assignment on preparing a budget for a foreign trip can be used as a preparatory task before learners tackle the bigger assignment, Finance: Assignment 8, which involves a more extended exercise in budgeting to pay for travel costs and accommodation.
- To understand strong and weak currencies, let learners discuss a range of examples of goods that are imported from foreign countries (for example, CDs, clothes, computers and cars) and where the strength of the foreign currency affects whether the price in rand will increase or decrease. Examples of this are given in the Learner's Book, and learners can research further examples by looking at the prices of goods in dollars, pounds, euros and so on on the internet, and converting these prices to rand using the daily exchange rate for a few days. They will soon see whether the rand becomes stronger (if the price of the item decreases) or weaker (if the price of the item increases).
- To understand the concept of the buying power of a currency, learners need to think about the cost of goods in that currency for the people who live in that country (for example, the price of goods in US$ for people who live in the USA) relative to the amount of money people earn in the same country. The table in the Learner's Book that shows the number of hours needed to earn enough money to buy 1 kg of bread, 1 kg of flour, a Big Mac or an iPod nano is a concrete way to express the buying power of a currency when compared to other currencies. Learners may need help to see how this concept works in practice. If necessary give more examples of goods that can be used to compare buying power (for example, how many months or years a South African who earns R10 000 per month must work to afford a car that costs R250 000 and how many months or years

German who earners €2 500 per month must work to afford the same car that costs €17 000 in Germany).

- Finance: Assignment 8, Plan a holiday in southern Africa, brings together a number of concepts and methods that learners have worked with during this course. They must use exchange rate tables to estimate the costs of transport and accommodation and use these estimates to draw up a budget; they must read tariff tables to find the costs of different sections of the journey; they must interpret maps and transport timetables to find information about the time taken to cover the different possible routes, and which scheduled trains or buses to catch; and they must combine all this information to create a travel schedule that fits into the available number of days (21), stays within the budget limit (R10 000), and covers at least three countries.

Solutions

2.1 **Revise** using estimations of currency values

Learner's Book page 401

1. **a.** Nigerian naira 1 960,33

b. R261,96

c. 550 Algerian dinar ÷ 81,5549 = $6,74
3 000 Zambian Kw ÷ 4 727,5 = $0,63
550 Algerian dinar cost more.

d. R750 = 554,33 Egyptian pound
You do not have enough to afford the room.

e. Angola kw: 795 ÷ 11,6316 = R68,35
Mozambican metical: 280 ÷ 3,4088 = R82,14
The Angolan price is better.

2. **a.** 30 400 Angolan kwanza = R2 613,57

b. 72 600 Tanzanian shillings = R377,90

c. 1 600 Kenyan shilings = R156,73

d. 30 000 Zambian kwacha = R52,14

e. 95 Namibian dollars = R94,95

2.2 **Assignment:** Prepare a budget estimate for a foreign trip

Learner's Book page 403

Answers will differ.

2.3 **Practise** comparing stronger and weaker currencies

Learner's Book page 485

1. **a.** March 2009: £1 = R14,5361; £1 = R14,54
May 2010: £1 = R11,2282; £1 = R11,23
April 2011: £1 = R10,5008; £1 = R10,50
July 2012: £1 = R12,5275; £1 = R12,53

b. The pound became weaker against the rand because it decreased in value from £1 : R14,54 to £1 : R11,23.

c. Answers will differ.

d. March 2009: €1 = R12,92
May 2010: €1 = R9,25
April 2011: €1 = R9,57
July 2012: €1 = R9,84

e. May 2010

f,g. Answers will differ.

2. a. i. April 2011

ii. US$10,99 × R6,5711/$ = R72,22

b. i. April 2011

ii. £12,50 × R10,5008/£ = R131,26

c. i. May 2010

ii. €328,90 × R9,2515/€ = R3 042,82

3. a. May 2010: R7 500 ÷ R11,2282/£ = £667,96
July 2012: R7 500 ÷ R12,5275/£ = £598,68
She would save £69,28 if she bought the painting in July 2012.

b. March 2009:
R189,95 per pair × 2 000 pairs ÷ R12,9248/€
= €29 393,10

April 2011:
R189,95 per pair × 2 000 pairs ÷ R9,5663/€
= €39 712,32

April 2001	€39 712,32
March 2009	€29 393,10
Difference	€10 319,22

c. €70 × R9,5663/€ = R669,64
$65 × R6,5711/US$ = R427,12

d. i. €70 + 5% = €73,50
€65 + 5% = €68,25

ii. $73,50 × R9,8369/$ = R723,01
$68,25 × R8,0136/$ = R546,93

Euro tariff:

$$\frac{R723,01 - R669,64}{R669,64} \times 100\% = 7,97\%$$

US dollar tariff:

$$\frac{R546,93 - R427,12}{R427,12} \times 100\% = 28,05\%$$

2.4 **Practise** analysing an article about the buying power of different currencies

Learner's Book page 407

1. Answers will differ.

2. The Netherlands

3. Amsterdam, Berlin, Dubai, London, New York, Sydney, Tokyo and Zurich

4. a. Amsterdam, Berlin, Dubai, Johannesburg, London, New York, Singapore, Sydney, and Zurich

b. London, New York, Zurich

5. Answers will differ.

6. False. The less time it takes to earn the money to buy an iPod, the greater the buying power of the currency compared to our countries.

7. Answers will differ.

Revise and consolidate

Learner's Book page 411

1. a. R249 550 × 14% = R34 937

b. 60 kg × 89,98/10 kg × 14% = R75,58

c. 150 ℓ at R230/30 ℓ inclusive of VAT
150 ℓ × R230/30 ℓ ÷ 114 × 14 = R141,23

2. a. R899,99 ÷ 114 × 100 = R789,46

b. R3 450 ÷ 114 × 100 = R3 026,32

c. R350 (VAT inclusive) for 10 light bulbs
R35 (VAT inclusive) for 1 light bulb
R35 ÷ 114 × 100 = R30,70

3. a. 200 bags at R10,50/bag = R2 100 (zero-rated)

b. (R1 650 ÷ 4) + 14% = R470,25 per tyre (inclusive)

4.

Details	Total sales income (VAT incl.) (R)	Sales of zero-rated goods (R)	Sales of taxable goods (R)	VAT amount (R)
January	1 268 894,32	994 782,16	11 694 162,16	33 662,90
February	14 067 881,17	1 338 157,98	12 729 723,19	1 563 299,34
VAT payable				2 999 424,52
March	14 993 015,46	1 655 981,53	13 337 033,93	1 637 881,36
April	13 872 172,06	894 716,33	12 977 455,73	1 593 722,63
VAT payable				3 231 603,99
May	15 221 954,34	2 672 841,95	12 549 112,39	1 541 119,06
June	15 008 925,17	2 115 390,88	12 893 534,29	1 583 416,49
VAT payable				3 124 535,55

5. i. a. R20,45 per week

b. R92,33 per fortnight

c. R392,28 per month

d. R4 257,78 per year

ii. a. R20,45 per week

b. R92,33 per fortnight

c. R392,28 per month

d. R4 257,78 per year

6. a. R13 674

b. R136,74

c. R14 439,74

d. R144,40

7. a. R1 135 ÷ 7 = R162,14 per day
58% of R162,14 = R94,04 per day

b. Learners dicuss answers.

8. a. R75 250 + 35% × (R390 235 – R325 000)
= R98 082,25

b. R168 250 + 40% × (R1 200 345 – 580 000)
= R416 388

c. R127 720 × 18% = R22 989,60

d. R128 750 + 38% × (R43 566 – R455 000)
= R139 605,08

e. R27 000 + 25% × (R228 300 – R150 000)
= R46 575

f. R27 000 + 25% × (R198 038 – R150 000)
= R39 009,50

9. a. Taxable income
R16 503 × 12 = R198 036

Tax payable
R27 000 + 25% × (R198 036 – R150 000)
= R39 009

Taxable income after increase
R17 196 × 12 = R206 352

Tax payable after increase
R27 000 + 25% × (R206 352 – R150 000)
= R41 088

b. Taxable income: R40 297 × 12 = R483 564

Tax payable:
R128 750 + 38% × (R483 564 – R455 000)
= R139 604,32

Taxable income after increase: R43 561 × 12 = R522 732

Tax payable after increase:
R128 750 + 38% × (R522 732 – R455 000)
= R154 488,16

c. Taxable income: R100 029 × 12 = R1 200 348

Tax payable:
R168 250 + 40% × (R1 200 348 – R580 000)
= R416 389,20

Taxable income after increase: R112 032 × 12 = R1 344 384

Tax payable:
R168 250 + 40% × (R1 344 384 – R580 000)
= R474 003,60

d. Taxable income: R19 025 × 12 = R228 300

Tax payable:
R27 000 + 25% × (R228 300 – R150 000)
= R46 575

Taxable income after increase: R23 591 × 12 = R283 092

Tax payable:
R48 250 + 30% × (R283 092 – 235 000)
= R62 677,60

10. a. i. Annual taxable income

Gross income		
Annual salary (R19 450 × 12)	233 400	
Additional income (R16 000 × 12)	192 000	
Total gross income		425 400
Business expenses (R2 150 × 12)	25 800	
Pension contribution (295 × 12)	3 540	
UIF	2 334	
Subtract total non-taxable deductions		31 674
Taxable income		393 726

ii. Total tax payable according to tax tables

(R75 250 + 35% (R393 726 – R325 000))	99 304,10
Subtract primary tax rebate	– 10 755,00
PAYE deducted by employer (R2 217,50 × 12)	– 26 610,00
Balance owing	R61 339,10

b. i. Gross income

Sale of furniture	R338 450
Interest earned on investment	R44 280
Total gross income	R382 730
Business expenses	R18 700
Retirement annuity fund contributions	R8 400
Subtract total non-taxable deductions	– R27 100
Taxable income	R355 630

ii. Total tax payable (according to tax tables):

R75 250 + 35% (R355 630 – 325 000))	R85 970,50
Subtract primary tax rebate	– R10 755,00
Tax payable	R75 215,50

c. ii. Gross income

Annual wage (R7 280 × 52)	378 560,00	
Study bursary (R1 250 × 12)	15 000,00	
Total gross income		393 560,00
Pension fund contrution (R350 × 52)	18 200,00	
UIF	3 785,00	
Subtract total non-taxable deductions		21 985,60
Taxable income		371 514,40

ii. Tax payable as per tax tables:

(R75 250 + 35% (371 574,40 – 325 000))	91 551,04
Less primary tax rebate	– 10 755,00
PAYE deducted by employer (R1 130 × 52)	– 58 760,00
Tax payable	R22 036,04

11. a. IRP5
b. R302 660
c. R6 400
d. R35 875,24
e. No, Thoko only worked eight pay periods.
f. ITR12
g. Yes
h. The end period should be 20111031, not 20120228.
The taxpayer only worked eight pay periods.
i. Learners discuss answers.
j. Physiotherapist
k. Learners discuss answers.
l. Answers will differ.

12. a. 8 209,25 Swedish krona
b. 2 175,53 Turkish lira
c. US$1 224,07
d. 37 517,59 Mauritian rupees
e. 68 247,74 Indian rupees
f. 1 389 069,10 South Korean won

13. 40 roubles = R10,21842131 ≈ R10,22
Export costs: R2 per watermelon
R10,22 – R2,00 = R8,22
The maximum income from the sale of one watermelon is R8,22.

14. Package holiday costs

Adults: 12 000 Turkish lira × 3	36 000
Children: 6 200 Turkish lira × 3	18 600
Airfares: 22 995 lira × 6	137 970
	192 270

192 570 ÷ 0,217553 = R885 257,21
They have enough funds to go on holiday to Turkey.

15. a. Iranian rial (R1 = 1 500,458960 rials)
b. Answers will differ.

16.

Currency	US$	ZAR
Algerian dinar	Stronger	Stronger
Angolan kwanza	Stronger	Weaker
Botswana pula	Weaker	Weaker
Egyptian pound	Weaker	Stayed the same
Ghanian cedi	Weaker	Stronger
Kenyan shilling	Stronger	Weaker
Mozambican metical	Stayed the same	Weaker
Malawi kwacha	Stronger	Weaker
Mauritian rupee	Stronger	Stronger
Nigerian naira	Stronger	Weaker
Zambian kwacha	Stronger	Stronger

Unit 3
Floor and elevation plans

Learner's Book pages 418–429

Teaching tips

- Learners worked with a range of simple floor plans in Grade 10 and Grade 11. This year they will extend this work to include the floor plans of more complex structures. They will also use elevation plans (views of a structure from the back, front and sides). Once learners can read and interpret plans, they will need to apply their skills in Unit 5 when they build scaled 3D models of a hall and solve spatial problems by modelling using 2D scaled diagrams and by calculation.
- Note that we have used the architectural and surveying convention of labelling elevation plans. In this convention, the elevations are labelled according to the direction that they face. In other words, a north elevation shows the north-facing side of a building. If you were standing looking at the north elevation, you would be facing south. We have used this convention as it is the one used by the building industry in South Africa. Note also that some elevations on plans are not labelled using compass directions if the building is not oriented towards one specific direction. In such cases, elevations are labelled according to the street they face. For example, Kromboom Road Elevation (the side facing Kromboom Road).
- Make sure the learners can work with line scales and ratio scales as these will be used throughout this unit.

Solutions

3.1 **Assignment:** Work with floor plans and assembly diagrams

Learner's Book page 419

1. a. The floor plan of a single bedroom flat

b. Answers will differ.

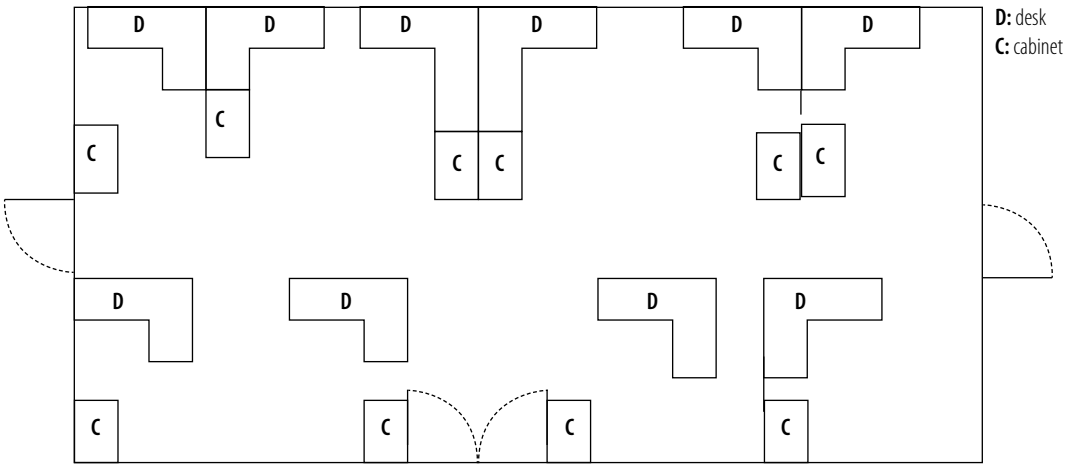
c. Two windows

d. Inwards

e. Bath, toilet, sink and fittings, kitchen sink, oven, fridge

f. When you enter the flat, you will see the kitchen on the left, the living room straight ahead, with the bedroom to the right of the living room. The bathroom is on the right.

2. a, b, d.



c. Filing cabinet:

Length: $\frac{6\text{ mm}}{90\text{ mm}} \times 12\,000\text{ mm} = 800\text{ mm long}$

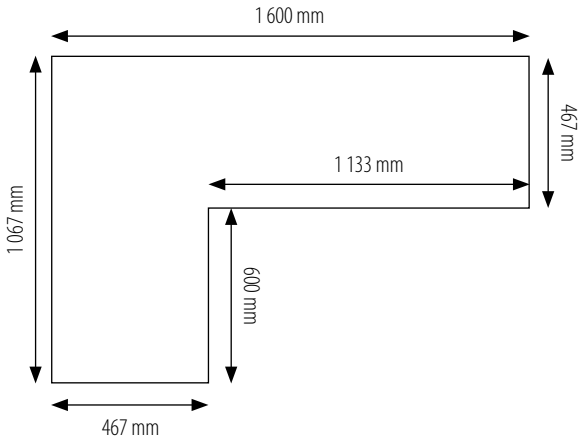
Width: $\frac{3{,}5\text{ mm}}{90\text{ mm}} \times 12\,000\text{ mm} = 467\text{ mm wide}$

L-shaped desk:

Length: $\frac{12\text{ mm}}{90\text{ mm}} \times 12\,000\text{ mm} = 1\,600\text{ mm}$

Width: $\frac{3{,}5\text{ mm}}{90\text{ mm}} \times 12\,000\text{ mm} = 467\text{ mm}$

Length on $\frac{8\text{ mm}}{90\text{ mm}} \times 12\,000\text{ m} = 1\,067\text{ mm}$

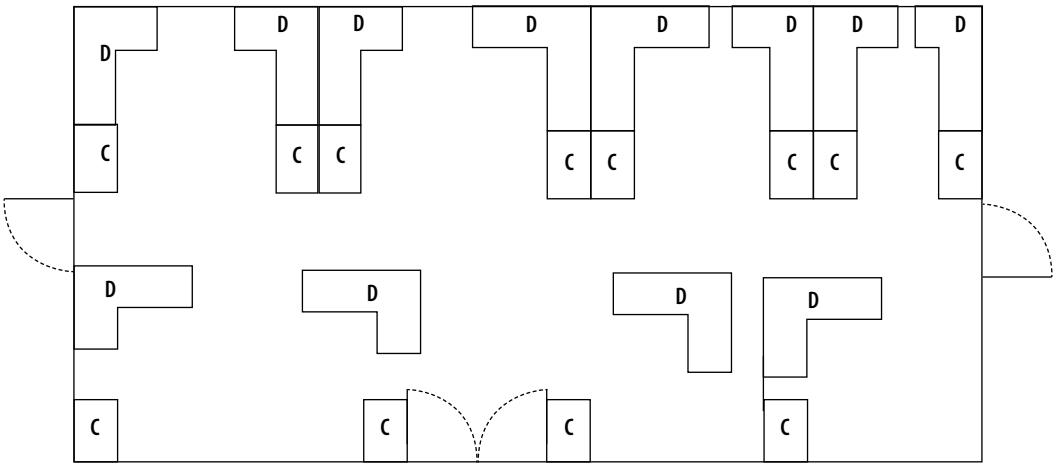


Chair:

$\frac{5\text{ mm}}{90\text{ mm}} \times 12\,000\text{ mm} = 667\text{ mm}$

A chair occupies a space of 667 mm × 667 mm.

e. Answers will differ.
Below is an example.



3. **a.** Plug B
b. The pins are rectangular in the UK and not round like South African plugs.
c. Answers will differ.

3.2 **Practise** interpreting elevation plans

Learner's Book page 422

1. Answers will differ.

2. 2 400 mm (2,4 m)

3. $\frac{24{,}5 \text{ mm}}{15 \text{ mm}} \times 2\,400 \text{ mm} = 3\,920 \text{ mm}$
The height of the roof is 3,92 m.

4. **a.** The door is to the right of the windows on the left and 2 400 m from the edge of the wall.
b. There are 11 windows (excluding the window on the door).
c. Four windows
d. About 875 mm and 612,5 mm

3.3 **Practise** finding features on an elevation plan

Learner's Book page 424

1–4. Answers will differ.

3.4 **Practise** answering questions about compass directions in construction

Learner's Book page 425

1. During midsummer (the middle of December) the room gets the least sunlight.
The angle between roof and angle *c* is 75°.

2. The angle changes from season to season because the southern hemisphere's position to the sun changes during the year. The angle becomes smaller from summer to winter.

3. The sun is lower in the sky during winter.

4. North-facing rooms face towards the sun and are, therefore, warmer. South-facing rooms face away from the sun and are, therefore, colder.

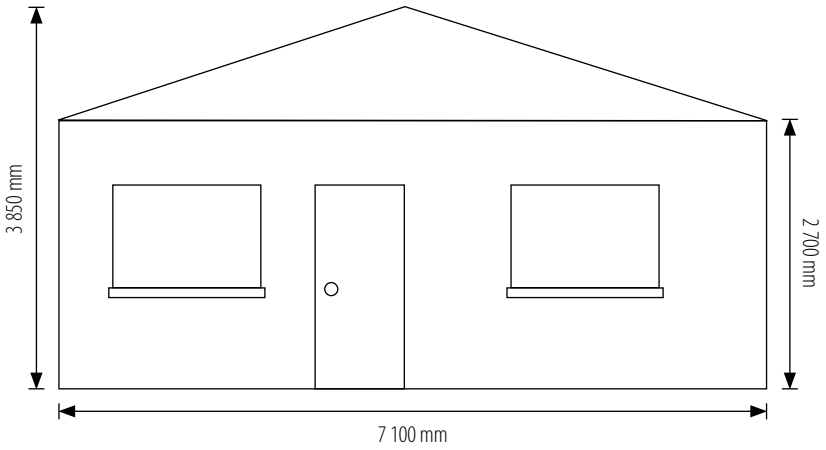
5. A slight roof overhang provides some shade in summer, but it lets in the sun during winter, so that a room is not cold.

6. **a.** Solar panels are installed on the north-facing side of a roof to face the sun as much as possible. This makes them more effective in trapping the energy from the sun.
   b. You would install it at an incline facing the north to trap as much of the sun's energy as possible.

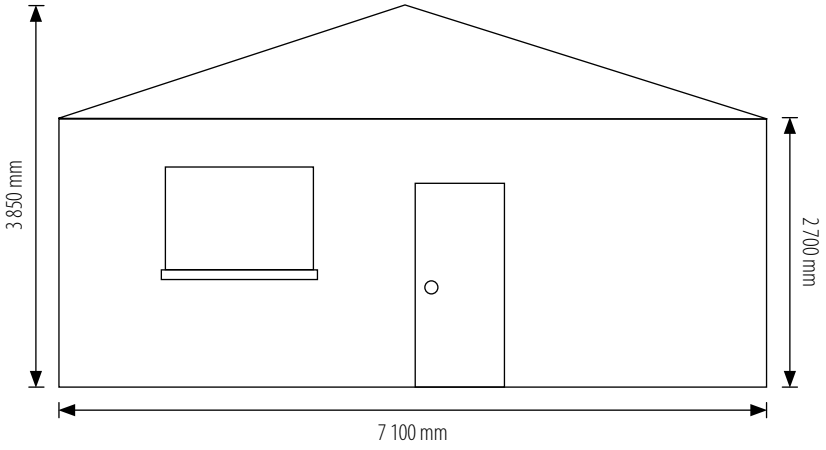
3.5 Assignment: Draw scaled elevation plans and use them to calculate measurements and costs

Learner's Book page 426

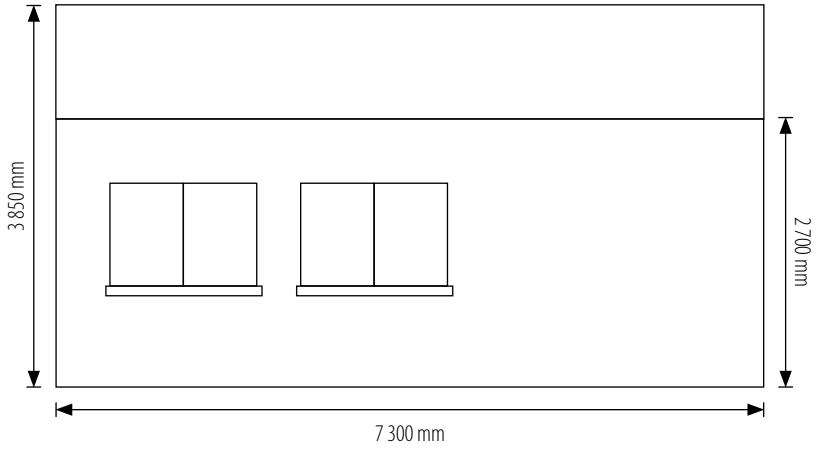
1.



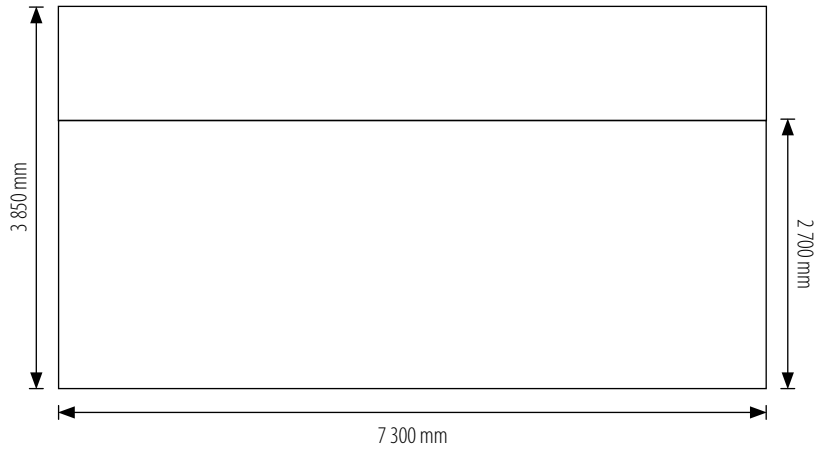
North elevation



South elevation



East elevation



West elevation

2. North elevation:
7 100 mm × 2 700 mm + $\frac{1}{2}$ × 7 100 mm × (3 850 mm – 2 700 mm)
– (2 × 1 511 mm × 949 mm + 2 100 mm × 950 mm)
= 19 170 000 mm^2 + 4 082 500 mm^2 – (2 867 878 mm^2 + 1 995 000 mm^2)
= 18 389 622 mm^2
= 18,389622 m^2

South elevation:
18 389 622 mm^2 + 1 511 mm × 949 mm
= 18 389 622 mm^2 + 1 433 939 mm^2
= 19 823 561 mm^2
= 19,823561 m^2

East elevation:
2 700 mm × 7 300 mm – (2 × 1 022 mm × 949 mm)
= 19 710 000 mm^2 – 1 939 756 mm^2
= 17 770 244 mm^2
= 17,770244 m^2

West elevation:
2 700 mm × 7 300 mm
= 19 710 000 mm^2
= 19,710000 m^2

Total surface area = 75,693427 m^2

3. (R9,50 + R12,60) × 75,693427 m^2
= R1 672,82

» Revise and consolidate

Learner's Book page 428

1. **a.** 76 mm = 35 600 mm
1 mm = 468,42
40 mm : 19 500 mm
1 mm : 487,5
Approximately 1 : 480

b. About 1 m

c. 10 080 mm ≈ 10 m

d. 9,2 m × 9,5 m – 2 m × 2 m
= 87,4 m^2 – 4 m^2
= 83,4 m^2

e. 7,2 m × 3,4 m = 24,48 m^2
1,5 m from side fence

f. Pool on plan:
10 mm × 15 mm × 1 500 mm
= 4 800 mm × 7 200 mm × 1 500 mm

Pool in real life:
4,8 m × 7,2 m × 1,5 m
= 51,84 m^3

2. a. Answers will differ.

b. Bedroom:
7' × 30,5 cm = 213,5 cm
13' × 30,5 cm = 396,5 cm
So, 2,135 m × 3,965 m = 8,465275 m^2

Living room:

13' × 30,5 cm	396,5 cm
11" × 2,5 cm	27,5 cm
	424,0 cm
8' × 30,5 cm	244,0 cm
8" × 2,5 cm	20,0 cm
	264,0 cm

So, 4,24 m × 2,64 m = 11,1936 m^2

Porch:

8' × 30,5 cm	244,0 cm
12' × 30,5 cm	366,0 cm
6" × 2,5 cm	15,0 cm
	381,0 cm

So, 2,44 m × 3,81 m = 9,2964 m^2

Total:
14' × 30,5 cm = 427,0 cm
22' × 30,5 cm = 671,0 cm
∴ 4,27 m × 6,71 m = 28,6517 m^2

c. South and west

d. Answers will differ.

e. 2 m × 0,3 m = 0,6 m^2
(28,6517 m^2 + 9,2964 m^2) ÷ 0,6
= 63,25
= 64
They need 64 floor boards.

f. 64 boards × 2 m × R39,65 + R487,80
= R5 563,00

Unit 4
Probability

Learner's Book pages 430–447

Teaching tips

- Before you work through this topic, you may need to revise the basic terminology used to talk about probability. You can use the list and the activity on pages 430 and 431 in the Learner's Book to do this.
- In this unit, learners will continue to work with games that make use of coins and dice and weather predictions to revise and consolidate the

concepts and terminology that were introduced last year. They will also continue to use two-way tables and tree diagrams to represent the sample space and outcomes of different events. Remember though that they do not need to use tree diagrams to calculate probability. They only use them to represent all the possible outcomes of one or more events.

- The contexts for teaching probability are extended in this unit to include lottery results and gambling. The aim is for learners to understand that the chances of winning in these contexts are very small, and for them to consider and evaluate some of the common statements about winning in these contexts critically.
- Learners will also work with a range of contexts where there is a chance of getting an incorrect result. Learners should be familiar with advertisements that make statistical claims (for example, 80% of teenagers who use this face wash reported fewer pimples). Now they will also investigate the concept of risk in terms of probability. For example, insurance companies charge higher premiums if a driver is below the age of 25 as young drivers have a higher risk of being involved in an accident. Similarly, some insurance companies charge women less than men as their studies show women have a lower risk profile and are less likely to be involved in an accident. Encourage learners to make a collection of these kinds of claim from print media and discuss them in class.

Solutions

4.1 **Practise** revising probability terms

Learner's Book page 431

1. **a.** Naeem can take out a black, white, green or yellow sweet.
b. An experiment
c. An outcome
d. Impossible
e. Answers will differ.
f. Getting a black sweet; there is a 12 in 35 chance (34%) of getting a black sweet.

2. Answers will differ.

4.2 **Practise** determining and estimating probability

Learner's Book page 432

1. **a.** 1 in 9 **b.** 1 in 6 × 6 = 1 in 36 **c.** 1 in 2
d. 1 in 2 **e.** 1 in 12 **f.** 1 in 6

2. **a.** 3 in 50 **b.** 7 in 50 **c.** 40 in 50 – 4 in 5

3. **a.** 1 in 13 **b.** 3 in 13 **c.** 9 in 13

4. An experiment is not likely to give the same results as calculating the theoretical probability.

5. **a.** 1 in 200
b. 199 in 200
c. 12 000 ÷ 200 = 60 babies will be obese out of 12 000.

6. **a.** 23 in 1 000 are obese.
977 in 1 000 are not obese.
12 000/1 000 × 23 = 276 babies will be obese out of 12 000.

b,c. Answers will differ.

4.3 **Practise** working out the odds

Learner's Book page 434

1. **a.** 0,000004%
b. 2%
c. 0,990099% ≈ 0,99%
d. 10%
e. 31,25%

2. **a.** $52{,}1\% = \frac{52{,}1}{100} = \frac{1}{1{,}919}$
1 in 1,919

$47{,}9\% = \frac{47{,}9}{100} = \frac{1}{2{,}0877}$
1 in 2,0877

b. $25\% = \frac{25}{100} = \frac{1}{4}$
1 in 4 chance

c. $0{,}028\% = \frac{0{,}028}{100} = \frac{28}{100\,000} = \frac{1}{3\,571{,}428}$
1 in 3 571,43 chance

d. $50\% = \frac{50}{100} = \frac{1}{2}$
1 in 2 chance

e. $24{,}4\% = \frac{24{,}4}{100} = \frac{244}{1\,000} = \frac{1}{4{,}098}$
1 in 4,098 chance

4.4 **Practise** deciding which method to use to predict probability

Learner's Book page 436

1. **a.** Carry out a survey
b. Experiment
c. Historical
d. Theoretical probability
e. Theoretical (historical)
f. Theoretical probability
g. Historical/survey
h. Theoretical probability

2. **a.** **A** Women of average weight have a 50% higher chance of heart attack than women who weigh 15% below average.

B There is a 67% probability an earthquake of a magnitude of 6,7 or larger will strike in the greater Los Angeles area in the next 30 years.

There is a 63% probability that an earthquake of similar magnitude will strike in the San Francisco Bay area in the next 30 years.

The San Andreas fault has a probability of 59% or larger of generating an earthquake of 6,7 magnitude in the next 30 years.

C There is a 70% to 80% probability that the HIV virus sampled in four local women came from the same source.

D Smokers have a risk of getting heart disease that is two to four times that of non-smokers.

E Smokers have a 1 in 10 chance (10% probability) of contracting lung cancer. Non-smokers have a 1 in 100 chance (1% probability) of contracting lung cancer.

F The probability of a seat-belt failing is 0,015%.

b. Answers will differ.

1. a. 212

b. 89 pensioners

c. 71

d. i. 62 out of 212
= 29,25% or 1 in 3,42

ii. 45 + 13 = 58
58 out of 212
= 27,36% or 1 in 3,66

iii. 23 + 45 = 68
68 out of 212
= 12,26% or 1 in 8,15

e. Adult female: $\frac{23}{23 + 56} \times 100\% = 29{,}1\%$

Pensioner female: $\frac{45}{45 + 26} \times 100\% = 63{,}4\%$

Adult male: $\frac{19}{19 + 25} \times 100\% = 43{,}2\%$

Pensioner male: $\frac{13}{13 + 5} \times 100\% = 72{,}2\%$

The male pensioner is most likely to buy yoghurt.

f. The adult female group is least likely to buy yoghurt.

g. Answers will differ.

2. a. $\frac{423}{1\,000} \times 100\% = 42{,}3\%$
= 0,423

b. Answers will differ.

3. a, b. Answers will differ.

c. 20 000 × 0,23 = 4 600

4, 5. Answers will differ.

6. a.

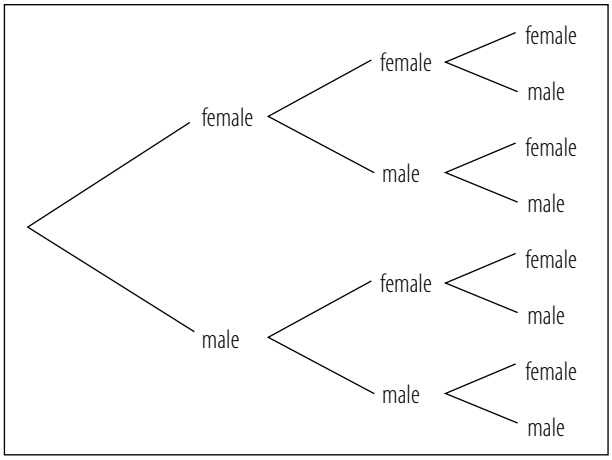
Type of accident	Odds of dying in one year	Lifetime odds of dying
All transport accidents	0,000163371 ≈ 0,016%	0,012658227 ≈ 1,27%
Accidents involving a pedestrian	0,000020485 ≈ 0,002%	0,001594896
Bicycle incident	0,000003126 ≈ 0,0003%	0,000243249 ≈ 0,02%
Motorcycle accident	0,000014795 ≈ 0,001%	0,0011507 ≈ 0,12%
Motor vehicle accident	0,000049185 ≈ 0,005%	0,003831417 ≈ 0,38%
Aeroplane accident	0,000001989 ≈ 0,0002%	0,000154798 ≈ 0,02%

b. Accident involving a pedestrian

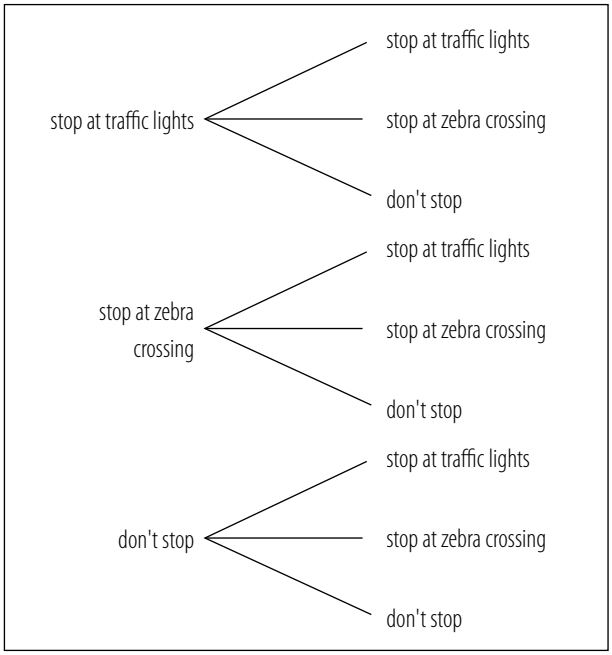
c. No, she could be involved in an accident as a pedestrian or a passenger.

d. Yes, there is a much lower probability of dying in an aeroplane accident than in a vehicle accident, or as a pedestrian in an accident.

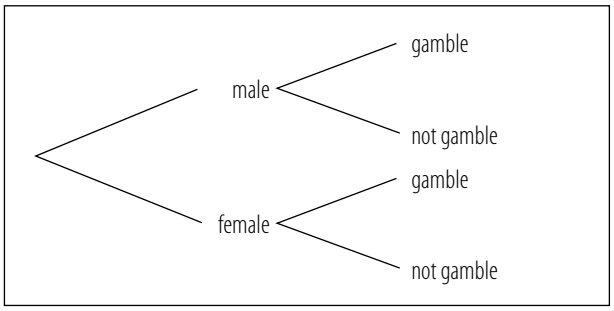
1. a.



b.



c.



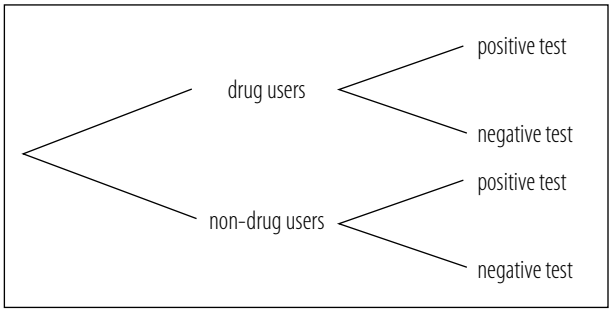
2. a. Score on spinner 1

	Score on spinner 1					
Score on spinner 2		1	2	3	4	5
	1	2	3	4	5	6
	2	3	4	5	6	7
	3	4	5	6	7	8
	4	5	6	7	8	9
	5	6	7	8	9	10

b. The scores with the highest probability is 6 (6 is the mode of all the scores in the data set).

c. 15 in 25 chance
= 3 in 5 chance or 60% probability

3. a.



b. Yes, it is possible to have a false positive result. Errors in the laboratorium's precedures, contaminated samples, and even other chemicals that produce similar results, may result in false positives.

4. a. Nine outcomes

b. RR
RA
RG
AR
AA
AG
GR
GA
GG

c. 1 in 9 chance = 11,11%
≈ 11%

d. 4 in 9 chance = 44,44%
≈ 44%

4.7 Assignment: Determining and interpreting the probability for Lotto numbers

Learner's Book page 442

1. a. 3,7 and 20

b. 48

c. i. 2 out of 48 chance
A 1 in 24 chance = 4,2%

ii. 28 out of 48
= 58,33% probability

iii. 14 out of 48 chance
= 29,2%

iv. 10 out of 48 chance
= 20,8%

2. a. 1 out of 49 = 2,04%

b. 24 out of 49 = 48,98%
≈ 49%

c. 9 out of 49 = 18,37%
≈ 18%

d. 10 out of 49 = 20,41%
≈ 20%

3. Answers will differ.

4. a. 16 (drawn 200 times)

b. 36 (drawn 138 times)

c. 8 288 ÷ 49 balls = 169 times

d–f. Answers will differ.

5. a. About 0,0000071%

b. 0,0355%

c–e. Answers will differ.

4.8 **Practise** interpreting results that may be wrong

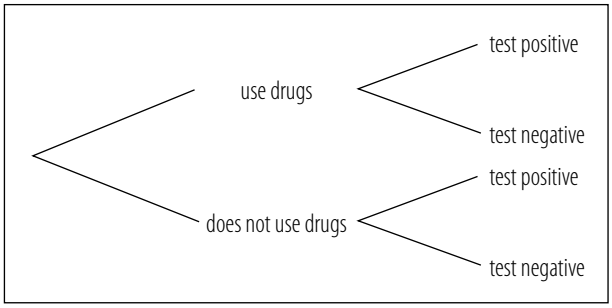
Learner's Book page 445

1. a. There is a 2% probability that the test will give a false result.

b. No, her brother might not be using drugs. However, it is 98% probable that he is using drugs.

c. No, her brother might be using drugs. However, it is 98% probable that he is not using drugs.

2. a.



b.

Learner status	Tests positive for drugs (fail test)	Tests negative for drugs (pass test)	Total
Learners who use drugs	274	6	280
Learners who do not use drugs	14	706	720
Total	**288**	**712**	**1 000**

c. $\frac{14}{288} = 0{,}0486 = 4{,}86\% \approx 5\%$

There is a 5% chance that a learner who is not using drugs will fail the test.

d. $\frac{6}{712} = 0{,}008426966$

There is a 0,84% chance that a learner who is using drugs will pass the test.

e. Answers will differ.

Revise and consolidate

Learner's Book page 446

1. a. A 25% chance of winning

b. A 100% chance the event will happen

c. A greater than 50% chance of winning than losing

d. The estimated chance that an event will happen

e. Data that is an outcome of an experiment

f. By chance and unplanned; not predetermined

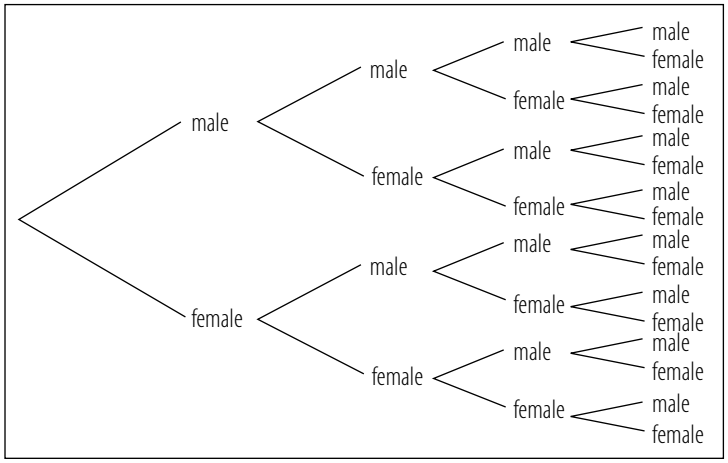
2. Answers will differ.

3. a. 2 out of 36 chance of winning
= 0,0556

b. Unfair. There is a very low probability of winning the R10.

c. 250 × R5 – 250 × R10 × 0,0556
= R1 250 – R139
= R1 111

4.



b. 6 in 16 = 0,375

c. 1 in 16 = 0,0625

5. a. 12 out of 17 500 are vaccinated but get the disease. There is a 0,0006857 probability of being vaccinated and getting disease. This is a 0,9993 probability that the vaccine is effective (greater than 99%).

b. 5,245 ≈ 5 children

6. Answers will differ.

Unit 5
Using models to investigate shape and space

Learner's Book pages 448–454

Teaching tips

- Mathematical modelling is a very useful life skill. At a basic level, people may draw diagrams of a room and use scaled versions of furniture to see how to arrange it. People may also make a model or prototype of an item (scaled or life size) to see how it will work and what it will look like. For example, architects often build scaled models of housing and/or office developments to show prospective buyers what they would get if they bought into a project. Engineering firms often make one version of an item and then use that as a template to manufacture many more. Jewellers make single items or they carve models out of wax and use these to make or case many more identical items.
- Learners will need to construct models in this unit. Make sure you have a supply of cardboard (such as old packaging containers or file covers), scissors and/or craft knives, adhesive tape and/or glue for learners to use.

Solutions

5.1 **Practise** modelling a container

Learner's Book page 448

1–6. Answers will differ.

5.2 Assignment: Containers and how much they hold

Learner's Book page 449

1–6. Answers will differ.

5.3 Investigation: The best shape and size of boxes

Learner's Book page 449

Answers will differ.

5.4 Practise making and using a model of a building

Learner's Book page 450

Answers will differ.

5.5 Investigation: Use scaled models to decide on the placement of furniture and fixtures for a fund-raising event

Learner's Book page 451

Answers will differ.

Revise and consolidate

Learner's Book page 452

1. **a.** Octagon

b. $2 \times 8 = 16$ sets of doors

c. 38 tables

d. 12 chairs per table × 38 tables = 456 chairs
456 people can be seated at the tables.

e. Answers will differ.

2. **a.** $84 \text{ mm} \times 500 = 42\,000 \text{ mm}$
$= 42 \text{ m}$

b. $\frac{1}{2} \times (54 \text{ mm} \times 500) \times (66 \times 500) \times 8$
$= \frac{1}{2} \times (27\,000 \text{ mm}) \times (33\,000 \text{ mm}) \times 8$
$= \frac{1}{2} \times 27 \text{ m} \times 33 \text{ m} \times 8$
$= 3\,564 \text{ m}^2$

3. Area per stand:
$(6 \text{ mm} \times 500) \times (7 \text{ mm} \times 500)$
$= 3\,000 \text{ mm} \times 3\,500 \text{ mm}$
$= 3 \text{ m} \times 3{,}5 \text{ m}$
$= 10{,}5 \text{ m}^2$
Number of stands: 61
$61 \times 10{,}5 \text{ m}^2 = 640{,}5 \text{ m}^2$

$$\frac{\text{area covered by stands}}{\text{total floor area}} = \frac{640{,}5 \text{ m}^2}{3\,564 \text{ m}^2} \times 100\%$$
$$= 18\%$$

4,5. Answers will differ.

TERM 4

WORKED ANSWERS

Learner's Book pages 455–495

Exemplar Paper 1: Memorandum

Learner's Book pages 476–485

Total: 150 marks

Question 1 (33 marks)

1.1.1 $\frac{3}{4}$ of $\sqrt{9\,673}$ – 0,5 (5,9352 + 2,16937)
= 73,763 558… – 4,052 285
= 69,711 273… ✓
≈ 69,71 ✓

1.1.2 22,25% of R136,00
= $\frac{22,25}{100}$ × R136 ✓
or 0,2225 × R136 ✓
= R30,26 ✓

1.1.3 450 m = (450 ÷1 000) km
= 0,45 km ✓

1.1.4 5,34 million = 5,34 × 1 000 000 = 5 340 000 ✓

1.1.5 Price per egg = $\frac{R7,92}{6}$ ✓
= R1,32 ✓

1.1.6 Total number of days from January to July
= 31 + 28 + 31 + 30 + 31 + 30 + 31
= 212 ✓
So, the 200th day is in July. ✓

1.2.1 19:00 or 7 p.m. or 19h00 ✓ ✓

1.2.2 Wage = R18,00 × 12 × $2\frac{1}{2}$ ✓
= R540 ✓

1.3.1 Total income = profit + expenses
= R135 400 + R235 656 ✓
= R371 056 ✓

1.3.2 Sihle's share = R135 400 – R54 160
= R81 240 ✓
Ratio = 54 160 : 81 240 ✓
= 2 : 3 or 1 : 1,5 ✓
or 27 080 : 40 620
or 13 540 : 20 310
or 5 416 : 8 124

1.3.3 An increase of 8% implies 108% ✓
Profit in 2011 = $\frac{108}{100}$ × R135 400 or 1,08 × R135 400
= R146 232 ✓

or:

Increased amount = $\frac{8}{100}$ × R135 400 or 0,08 × R135 400

= R10 832 ✓

Profit in 2011 = R135 400 + R10 832 ✓

= R146 232 ✓

1.4.1 0; 24; 38; 38; 42; 50; 52; 56; 86 ✓

1.4.2 38 ✓

1.4.3 Mean = $\frac{52 + 86 + 24 + 38 + 56 + 42 + 0 + 50 + 38}{9}$

= $\frac{386}{9}$ ✓

= 42,8888…

≈ 42,89 ✓

1.5.1 Internet ✓

1.5.2 Difference = 605% – 48,4%

= 12,1% ✓

1.5.3 Computers ✓

1.5.4 Number of schools = $\frac{24,6}{100}$ × 2 500 ✓

= 0,246 × 2 500

= 615 ✓

Question 2 (32 marks)

2.1.1 $A = R150\,000(1 + 0,66)^3$ ✓ ✓

= R181 703,32 ✓

2.1.2 R1,00 (ZAR) = ¥ (CNY)

Amount = 15 000 × 0,89 ✓

= ¥13 350 CNY ✓

2.2.1 **a.** Number of coloureds = 4 424 100 ✓ ✓

b. Number of white females = 2 277 400 ✓ ✓

2.2.2 A = 24 329 000 – (19 314 500 + 646 600 + 2 243 000) ✓

= 2 124 900 ✓

2.2.3 Difference = 19 324 500 – 18 901 000 ✓

= 413 500 ✓

2.2.4 Asian females: $\frac{653\,300}{25\,662\,300}$ ✓ × 100%

= 2,546%

= 2,55 ✓

2.2.5 Male increase = 460 300 ✓

Female increase = 210 500 ✓

So, there was the greatest increase for males. ✓

2.3.1 R75 ✓ ✓

(Accept any amount between R73 and R77.)

2.3.2 24 single trips ✓ ✓

2.3.3 Number of single trips = 3 × 2 = 6 ✓

Cost = R45 ✓ ✓

(Accept any amount between R43 and R47.)

2.3.4 $\frac{\text{Cost of 22 single trips}}{\text{22 return trips}}$

= 2 × R165 ✓

= R330 ✓

(Accept any amount between R326 and R334.)

Question 3 (36 marks)

3.1.1 Cost = 3 × R5,75 + 5 × R1,25 ✓
= R23,50 ✓

3.1.2 Number of carrots = $\frac{\text{R31,75} - (4 \times \text{R5,75})}{\text{R1,25}}$ ✓
$= \frac{\text{R8,75}}{\text{R1,25}}$
= 7

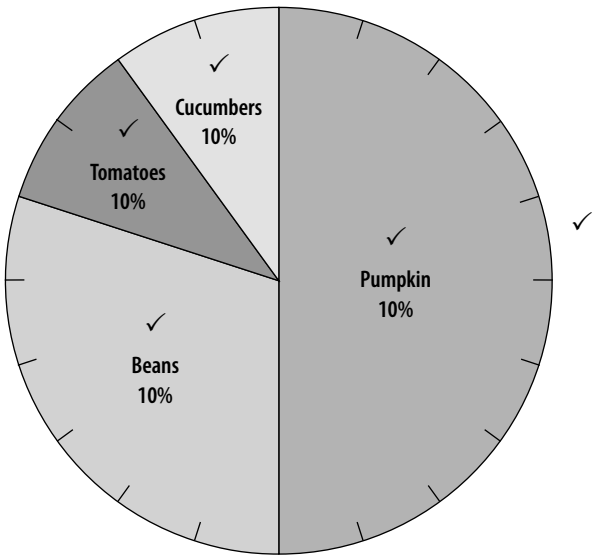
3.2.1 Area = 2,5 m × 1,5 m ✓
= 3,75 m^2 ✓

3.2.2 Volume = 2,5 m × 1,5 m × 7,5 cm ✓
= 2,5 × 1,5 × 0,075 ✓
= 0,28125 m^3
= 0,28 m^3 ✓

3.3.1 **a.** A = 100% – (48% + 10,6% + 2,7% + 31,5%) ✓
= 7,2% ✓

b. Packets of cabbage seeds = 48% of 525 ✓
= 0,48 × 525
= 252 ✓

3.3.2



3.4.1 **a.** Volume = 3,14 × (0,988 m)^2 × 2,398 m ✓
= 7,81238… m^3
≈ 7,812 m^3 ✓

b. Height = $\frac{80}{100}$ × 2,498 m ✓
= 1,9984 m
≈ 1,998 m ✓

3.4.2 Surface area of the tank
= 3,14 × 1 m × (2 × 2,5 m + 1m) ✓ ✓
= 3,14 m × 6 m ✓
= 18,84 m^2 ✓

3.4.3 5 mm in 1 minute, so, average rate = 5 mm/min.
Time taken = $\frac{1\,200 \text{ mm}}{5 \text{ mm/min.}}$
= 240 min. ✓
= 4 h ✓

3.5.1 $7{,}5 \times A = 30$ ✓

$A = \frac{30}{7{,}5}$ workers

$= 4$ workers ✓

$B \times 8 = 30$ ✓

$B = \frac{30}{8}$ h

$= 3{,}75$ h ✓

3.5.2 Inverse proportion or indirect proportion ✓

Question 4 (28 marks)

4.1.1 P = R600,00 ✓ ✓

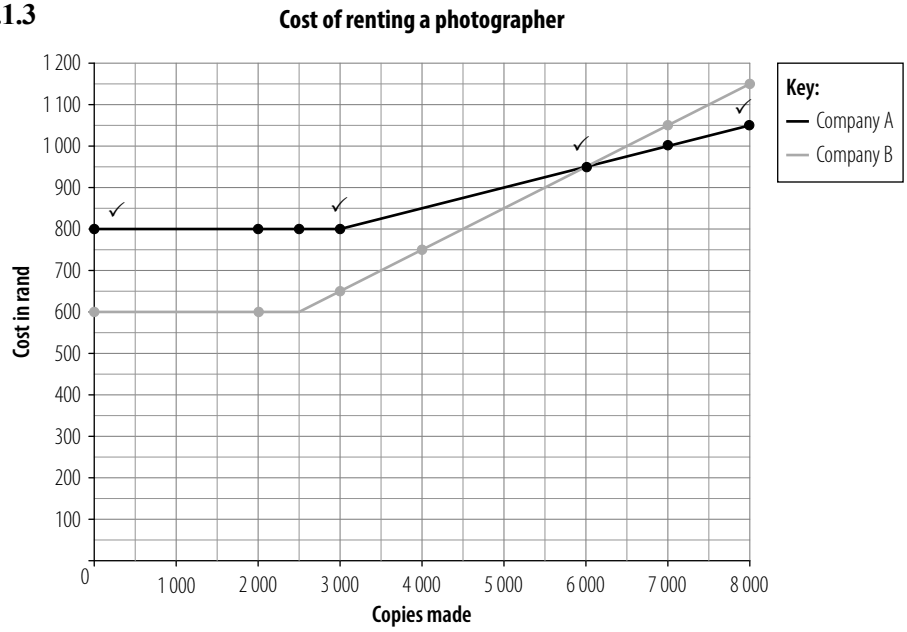
Q = R800,00 + 1 000 × R0,05 ✓

= R850,00 ✓

4.1.2 Cost per month

= R600,00 + (number of copies more than 2 500) × R0,10 ✓ ✓ ✓

4.1.3



4.1.4 6 000 copies ✓ ✓

4.1.5 Saving = R1 050 – R1 000 ✓

= R50

Company A ✓

4.2.1 Stationery room ✓

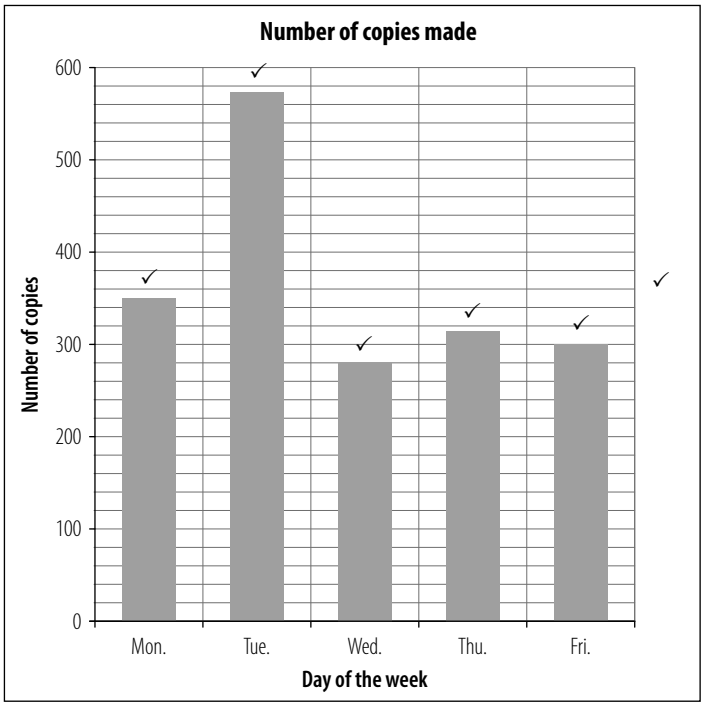
Kitchen ✓

4.2.2 Actual width = 1,33 cm × 300 ✓

= 399 cm ✓

= 3,99 m ✓

4.3.1



4.3.2 Wednesday ✓

Question 5 (21 marks)

5.1.1 2 tanks = 2 × 26 gallons
= 52 gallons

5.1.2 16 gallons ✓ ✓
(Accept values more than 15, but less than 175.)

5.1.3 3 gallons ✓ ✓
(Accept any value from 3 to 5.)

5.1.4 18 gallons = 18 × 4,546 ℓ
= 81,83 ℓ ✓

5.1.5 Cost = 15,76 ℓ × R9,92/ℓ ✓
= R156,34 ✓

5.1.6 Percentage decrease = $\frac{0,86}{9,92} \times 100\%$ ✓ ✓
= 9,66935…%
≈ 8,67%

5.2.1 B2 or 2B ✓ ✓

5.2.2 Karoo National Park ✓
Bontebok National Park ✓

5.2.3 Northwest ✓ ✓

5.2.4 Average speed = $\frac{153 \text{ km}}{\frac{1}{2} \text{ h}}$ ✓
= 306 km/h ✓

(Source: Reproduced with permission from the Department of Basic Education)

Exemplar Paper 2: Memorandum

Learner's Book pages 486–495

Total: 150 marks

Question 1 (28 marks)

1.1.1 45 mm = 4,5 cm ✓
Scale
4,5 cm : 265 cm ✓
= 1 : 58,88
= 1 : 58,89 ✓

1.1.2 6 m wide plastic
He would have to buy 3 m (and would have a lot of material left over).
Cost = 3 m × R44,99/m ✓
= R134,97 ✓

Cut to order plastic
Area = 380 cm × 265 m ✓
= 10,07 m^2 ✓
Cost (excl. VAT) = R10,07 m^2 × R12,24/m^2
= R123,26 ✓

Cost including VAT:
100% + 14% = 114%
So, cost = $\frac{114}{100}$ × R123,26
= R140,52 ✓

The more economical way of buying the ground sheet is to buy the 6 m wide plastic sheeting. ✓

1.2.1 9 hours ✓ ✓

1.2.2 7 ºC ✓
15:00 ✓

1.2.3 Between 00:00 and 09:00 ✓

1.2.4 Day 1:
Range = 15ºC – (–4 ºC) ✓
= 19 ºC

Day 2:
Range = 1=7 ºC – (–1,6 ºC) ✓
= 8,6 ºC

He should go on day 1. ✓ Although the day–night temperatures are colder than on day 2, the daytime temperatures are higher and the temperature range is larger. ✓ ✓

Or, he should go on day 2. Although the daytime temperatures are colder than day 1, the nighttime temperatures are warmer.

1.3.1 1513; 912; 1513; 1003; 1052 ✓
5 fish ✓

1.3.2 median ✓ ✓

Question 2 (18 marks)

2.1.1 The profits for 2008 and 2010 were not plotted on graph B. ✓ ✓

2.1.2 Graph B ✓
Graph B conceals the years where the annual profit went down or where it remained the same, thus creating an impression that profits only increased every year. ✓ ✓

2.2.1 Volume = $3{,}14 \times (10\text{ cm})^2 \times 35\text{ cm}$ ✓ ✓
$= 10\,990\text{ cm}^3$
$= 10\,990\text{ ml}$ ✓

Total volume of juice = $9 \times 1\,200\text{ ml}$ ✓
$= 10\,800\text{ ml}$ ✓

The container is big enough to mix the juice in. ✓

2.2.2 40 servings of 200 ml = $40 \times 200\text{ ml}$
$= 8\,000\text{ ml}$ ✓

Juice left after 40 servings = $10\,800\text{ ml} - 8\,000\text{ ml}$ ✓ ✓
$= 2\,800\text{ ml}$

Number of 140 ml-servings = $\frac{2\,800\text{ ml}}{140\text{ ml}}$

$= 20$ ✓

2.2.3 Number of 140-ml servings

$= \frac{10\,800 - 200 \times x}{140\text{ ml}}$ ✓

Question 3 (30 marks)

3.1.1 Theft, using vulgar language and so on ✓ ✓

3.1.2 Percentage copying in Grade 10 = $\frac{156}{559} \times 100\%$ ✓
$= 27{,}91\%$ ✓

Percentage copying in Grade 11 = $\frac{187}{559} \times 100\%$
$= 33{,}45\%$ ✓

Percentage copying in Grade 12 = $\frac{216}{559} \times 100\%$
$= 38{,}64\%$ ✓

Increase from Grade 10 to Grade 11 = $33{,}45\% - 27{,}91\%$
$= 5{,}54\%$ ✓

Increase from Grade 11 to Grade 12 = $38{,}64\% - 33{,}45\%$
$= 5{,}19\%$ ✓

Mr Khan was correct; the percentage does increase by more than 5% in each grade.

Reasons could include:

- Senior learners are more stressed by the marks for assignments, tests and examinations and they fall into the trap of copying. ✓
- The increase in copying could be attributed to the higher academic demands in Grades 11 and 12. ✓

3.1.3 In most types of offence, there has been a decrease/decline in the number of offences from Grade 10 to Grade 12, except for copying that has increased. ✓

- The decline could be as a result of learners getting more mature as they grow. ✓
- Most prefects/team captains are in senior classes and they behave better as they are in leadership roles.
- In Grade 10 they do not know each other in their chosen subjects and they are not as tolerant of each other.
- The increase in copying could be attributed to the higher academic demands in Grades 11 and 12. ✓

(Any other relevant reason)

3.1.4 He could have used a compound bar graph to represent the data. It would clearly show the comparison between the different offences and between the different grades. ✓ ✓

Or, he could have used three pie charts. Each pie chart could represent a grade and it would be easy to compare the sectors of the pie charts.✓

3.2 Percentage of learners who arrive late daily (12A)

$= \frac{115}{50} \times 100\%$

$\approx 8{,}21\%$ ✓

Percentage of learners wo arrive late daily (12B)

$= \frac{172}{50} \times 42 \times 100\%$

$\approx 8{,}19\%$ ✓

Mr Abel's claim is not valid as the number of learners who arrive late daily is approximately the same for both classes.

Mr Abel probably based his claim on the fact that more learners from 12B arrived late than learners from 12A.

There are more learners is 12B than in 12A, so we could expect more absentees in 12B than in 12A. ✓

3.3.1 School starts at 07:35.

Time for assembly and period 1 = 5 min. + 45 min.
= 50 min. ✓

Time until the start of period 2 = 7 h 35 min. + 50 min.
= 8 h 25 min.

So, Tom arrived at 08:25. ✓

3.3.2 Tom did not go to school. ✓ ✓
Or, Tom arrived at school after Mr Abel had left the school to attend a workshop. ✓ ✓
Or, Mr Abel was teaching another class when Tom arrived. ✓ ✓

3.3.3 Zara arrived at school late seven times.

Total = (33 + 16 + 4 + 21 + 7 + 11) min.
= 119 min. ✓

Zara's mean = $\frac{119}{7}$ min. ✓
= 17 min. ✓

Question 4 (32 marks)

4.1.1 Time to leave home = 8 h 15 min. $(2\frac{1}{2}$ h)
= 5 h 45 min.

So, latest time to leave home is 05:45. ✓

4.1.2 Cost of petrol = R650 × 4 ✓
= R2 600 ✓

Maintenance costs = 2 × 65 km × 22 × R0,35/km
= R1 001 ✓

Colleague's contribution = 4 × R330
= R1 320 ✓

Total expenses = R2 600 + R1 001 – R1 320 ✓
= R2 281 ✓

4.2 Time taken = 42 min. = $\frac{43}{60}$ h = 0,7 h ✓

Average speed = $\frac{\text{distance}}{\text{time}}$ ✓

85,8 km/h = $\frac{\text{distance}}{0{,}7 \text{ h}}$ ✓

Distance = 85,8 km/h × 0,7 h
= 60,06 km ✓

4.3.1 First destination is Rosebank. ✓

Cost of the ticket to the second destination
= R70 – R43 = R27 ✓
The second destination is Rhodesfield. ✓

4.3.3 Total cost of travelling by Gautrain
= cost of ticket + cost of parking + cost of petrol + cost of bus
= R1 435 + 22 × R10 + R150 + 22 × 2 × R6
= R1 435 + R220 + R150 + R264 ✓ ✓ ✓ ✓
= R2 069 ✓

Cost of travelling by car (from 4.1.2) = R2 281

Savings = R2 281 – R2 069 ✓
= R212 ✓

4.3.4 Yes. ✓
She would save R212 per month ✓
She would save the wear and tear on her car. ✓

Question 5 (42 marks)

5.1.1 **a.** 75% of expenses = R520 + R390 + R140
= R1 050 ✓

Weekly expenses
= $\frac{\text{R1 050}}{75\%}$ ✓

= $\frac{\text{R1 050}}{75}$ ✓

= R1 400 ✓

b. Total cost (R) per week = R1 400 + 4 × x

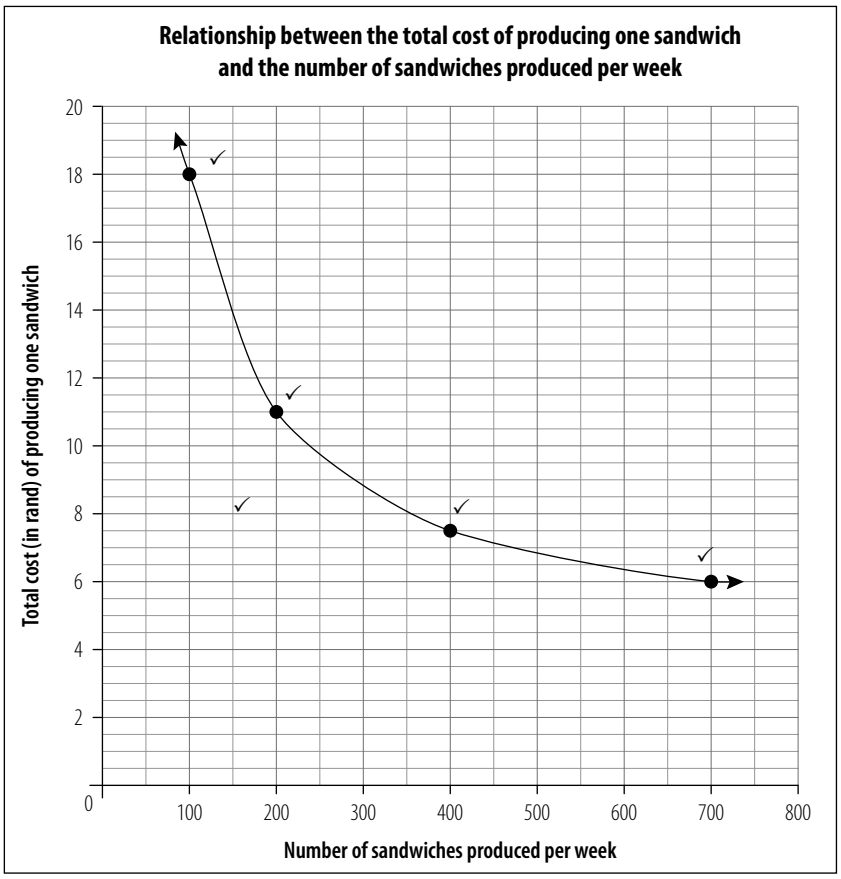
c. R2 400 = R1 400 + (R4 × number of sandwiches produced) ✓ ✓
R1 000 = R4 × number of sandwiches produced ✓
250 = number of sandwiches produced ✓

5.1.2 A will have no value since 0 sandwiches are made. ✓ ✓

B cannot have an answer as the ingredients for one sandwich cost R4. So, the total costs cannot be less than the cost for one sandwich. ✓ ✓

Or, you cannot produce a negative number of sandwiches.

5.1.3



5.1.4 **a.** 700 sandwiches ✓

b. $29 - \frac{\text{R1 400}}{x} = 4$ ✓

$$29 - 4 = \frac{\text{R1 400}}{x}$$

$$25 = \frac{\text{R1 400}}{x} \checkmark$$

$$x = \frac{\text{R1 400}}{25}$$

$$= 56 \checkmark$$

5.2.1 **a.** $d = \sqrt{2} \times s$

$= \sqrt{2} \times 110$ mm ✓

$= 155{,}56$ mm

≈ 16 cm ✓

b. Diagonal of box = 105% of 16 cm

$= 1{,}05 \times 16$ cm

$= 16{,}8$ cm ✓

Thus, length of sticker $= \frac{2}{3} \times 16{,}8$ cm

$= 11{,}2$ cm ✓

5.2.2 Thickness of triangular box $= 60 \times \frac{105}{100}$ mm

$= 60 \times 1{,}05$ mm ✓

$= 63$ mm

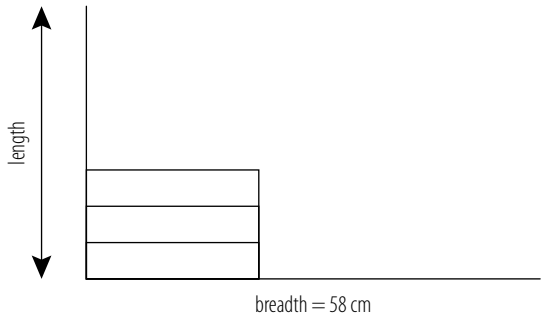
Side of triangular box $= 110 \times \frac{105}{100}$ mm

$= 110 \times 1{,}05$ mm ✓

$= 115{,}5$ mm

Sandwiches can be packed along the width or the length of the box.

Top view of the carton



Number of sandwiches along length = $\frac{946 \text{ mm}}{115{,}5 \text{ mm}} \approx 8$ ✓

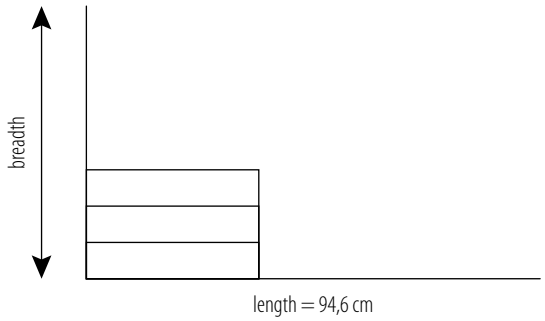
Number of sandwiches along width = $\frac{580 \text{ mm}}{63 \text{ mm}} \approx 9$ ✓

Number of sandwiches on the bottom layer of the box
$= 8 \times 9 \times 2$
$= 144$ sandwiches ✓

Number of layers = $\frac{360 \text{ mm}}{115{,}5 \text{ mm}} \approx 3$ ✓

Number of sandwiches in box = $144 \times 3 = 432$ ✓

Top view of the carton



Number of sandwiches along length = $\frac{946 \text{ mm}}{63} \approx 15$ ✓

Number of sandwiches along width = $\frac{580 \text{ mm}}{115{,}5 \text{ mm}} \approx 5$

Number of sandwiches in bottom layer of box
$= 15 \times 5 \times 2 = 150$ sandwiches ✓

Number of layers = $\frac{360 \text{ mm}}{115{,}5 \text{ mm}} \approx 3$ ✓

Number of sandwiches in a box = $150 \times 3 = 450$ ✓
Maximum number of sandwiches is 450. ✓

SECTION 4

RESOURCES

Term 1

» **Measurement:** Investigation 1

Create a body-based conversion table

Create a conversion table based on your body that you can use when you need to measure things and you do not have measuring instruments with you. Work with a partner who can measure your body parts and record them.

1. Decide which measurements you can record for parts of your body. For example, you can record some lengths to convert into metric units, such as the length of your index finger, the width of the first knuckle joint on your thumb, the distance from the middle fingertip on one hand to the opposite shoulder. But can you find mass, volume, area or other types of measurement using your body as a measuring unit?
2. Take turns measuring the body parts you have agreed to use with an accurate measuring tool.
3. Record these measurements in a conversion table that shows the metric equivalent of each body measurement.
4. How reliable is your body-based measurement system? Which body measurements will stay the same over time, and which could change? Discuss this in class.
5. Repeat the body measurement activity after six months, and check the new measurements against those you used for the conversion table. Update the conversion table if necessary.

» **Measurement:** Investigation 2

Research the meaning and use of measuring units

There are many measuring units that relate to aspects of our daily lives. Choose one unit listed below and work with a partner to research its meaning and use. Write a short report about the unit, including at least the following:

- what the measuring unit describes
- how the measurements are calculated
- who uses (or could use) the measuring unit and how
- examples of the measuring unit in use in practical situations.

1. Scoville units (Someone who grows or cooks with chillis will find this unit helpful.)
2. The DIN system of paper sizes (A4 and A5 paper are DIN sizes.)
3. Blood pressure measurement units
4. Heart rate measurement units
5. Blood-glucose measurements (Diabetic people measure their blood-glucose levels every day.)
6. Micromorts (If you do risky activities, this measurement could be useful.)
7. The Big Mac Index (People use Big Macs to compare purchasing power in different countries.)
8. The dollar-a-day measure of poverty in different societies

» **Measurement:** Investigation 3

Crop production schedules in your region

1. Interview a farmer in your area who produces any fruit, vegetable or grain crop, or a dairy farmer to find information about the production schedule for sowing, harvesting, packaging and distributing the farmer's product. (Even if you live in an urban area, you should be able to find a small-scale farmer in the area.) You can use the coffee production schedule on page 16 in the Learner's Book as a model, or design a timetable layout to record the information you collect.
2. Work with the rest of your class to combine the farm production schedules everyone collected from local farmers into one composite timetable that shows when all the crops grown in your area are sown, harvested and distributed to consumers in South Africa or to export markets.
3. Use this composite production schedule for a class discussion about the following questions:
   a. Which food crops will be affected by droughts, floods or other weather crisis conditions in your region at different times of the year?
   b. If you were to eat only foods that are produced in your region, which foods would you eat at different times of the year?

» **Finance:** Investigation 1

Opening a filing/record-keeping system for household financial documents

How does your household store important financial documents? Answer question 1 or question 2 and then take part in a class discussion about these topics.

1. Investigate how financial documents are stored in your home, and how easy or difficult it is to find a document when it is needed.
   a. Describe the system(s) your parents and/or other adults in the household use. If you have your own system for storing personal financial documents, describe it as well.
   b. Interview people in your home to find out if they have problems finding documents they need.
   c. Write a short report on the strengths and weaknesses of the storage system(s) that are used in your household.

OR

2. Find out how some organised and efficient people you know store their documents.
   a. Report on some of their systems or ideas for filing documents, keeping them safe from water and other hazards, and so on.
   b. Write a short proposal for a storage system that could work in your home. Include suggestions for who should be responsible for the system and where the documents should be stored.

Organise tariff information into an easy-to-use format

Cities with bus rapid transport (BRT) systems need to educate passengers about the new type of tariff system that uses a smartcard. The MyCiti bus system in Cape Town has a website with information about tariffs, fare increases, loading money onto a smartcard. Passengers could get confused by all the different details on the website.

Study the website pages below, and decide which tariff information is most important for passengers to know. Organise this information into an easy-to-use format such as a table. Use examples to illustrate how many trips a passenger could take, if they loaded different amounts of money onto their smartcard.

Your examples could look like this one:

If you load R65,00 onto your card, it will be allocated as follows: R63,37 (value load on the card) + R1,63 (bank fees of 2,5%) = R65,00. If your journey is on any route inside Table View, you will be able to use the card for 12 trips of R5 each, with R3,37 left on the card.

How it works

1. Get your card

Get a **my**connect card for R23 from MyCiTi station kiosks or participating retailers and load it with money for travel. You will need cash to both get your card and load money.

There is a fee of 2.5% (minimum R1.50) of the amount loaded at MyCiTi station kiosks and 3.5% (minimum R1.50) of the amount loaded at participating retailers. The load fee is only charged when you load money onto your card, and not when you tap to enter a station or bus. For more information about load fees click **here**.

You will be given a receipt for your **my**connect card. If you stop using MyCiTi or leave Cape Town, take your **my**connect card and receipt to a MyCiTi station kiosk to have the money you paid for the card refunded.

Please read the MyCiTi rules before getting a **my**connect card. By accepting a card, you accept the rules. The full set of rules and terms and conditions for using the card are available at station kiosks and on the website by clicking **here**.

2. Tap your card

Tap in by holding your card against this symbol))) on the validator as you board a MyCiTi bus or enter a station. Once the four green lights on the validator have lit up, remove your card and wait for the beep.

- 1 beep – transaction successful
- 2 beeps – Warning, transaction successful but there is less than R20 on your card. Top up as soon as possible.
- 5 beeps – Error, transaction declined. Reasons could include that your card has not been properly read by the validator or there is insufficient money available. Try tapping your card again or visit a MyCiTi station kiosk for help.

You will be charged a penalty if you enter a bus or station without tapping your card or with insufficient money on your card to travel.

3. Top up your card

Remember to top up your **my**connect card at MyCiTi station kiosks, participating retailers or selected cash-accepting ATMs to ensure you always have enough money on your card to travel. You will not be able to enter a station or bus if you do not have enough money loaded on your card.

Absa bank customers can load money directly from their bank card to their **my**connect card at any Absa ATM, for immediate use. Absa customers can also load money via internet banking although you still need to visit an Absa ATM or MyCiTi station kiosk to have the money transferred to your **my**connect card. Click **here** for more information about **my**connect services available to Absa customers.

Fares

Please note that MyCiTi is a card-based system, except on the airport route.

Each passenger needs a **my**connect card loaded with sufficient money for travel. Certain contactless cards displaying this symbol))) are also accepted.

You need cash to get your **my**connect card and load money, available at MyCiTi station kiosks and participating retailers. All MyCiTi users can also load money at selected cash-accepting Absa ATMs for immediate use. Absa bank customers can load money directly from their bank card to their **my**connect card, or via internet banking.

Click **here** to find out more about **my**connect.

R23	**my**connect card
R5.30	▸ F1 Gardens – Civic – Waterfront ▸ F14 Big Bay – Table View – Parklands East ▸ F15 Parklands East – Table View – Blouberg Sands ▸ F16 Marine Circle – Table View – Blouberg Sands
R10.60	T1 Table View – Civic Centre
Free	Children under 1 metre tall and under 4 years old

Airport service

Paper tickets for the airport service are available at Civic Centre and Airport station kiosks for children and others using concessionary fares. Adults can either use their **my**connect card or purchase a paper ticket for this service.

R57	Civic Centre – Airport route (A1)
R28.10	Civic Centre – Airport route (A1) for children 4–11 years old
Free	Children under 1 metre tall and under 4 years old
R449.50	Monthly ticket offering unlimited travel on the Airport – Civic Centre route (A1). This option works out cheaper if you travel between the Airport and Civic Centre more than 8 times a month. This ticket cannot be used by anyone else and must have the name of the ticket holder on it. Write your name on the ticket as soon as you buy it.

» **Finance:** Investigation 2

Compile a transport tariff guide for your area

People who use public transport (trains, buses, taxis and BRT systems) need to know what all the tariffs are for these services, so that they can choose the most economical way to travel. For example, a person may always take the train, even though on weekends it could cost less to use a bus for the same journey.

Research the forms of public transport in your area, and the tariffs for each form of transport. Compile this information into a poster or booklet. Include the following information for each form of transport:

- tariffs for weekdays, nights, weekends and public holidays
- whether the transport travels on main routes, in suburbs, and so on
- whether there are discounts available (season tickets), and what the discount tariffs are.

» **Finance:** Investigation 3

Compile a personal budget for the year after you complete Grade 12

Do this investigation after you have completed 5.3 Assignment: Compile a personal income-and-expenditure statement and budget on page 93 in the Learner's Book.

1. What are your plans after you complete Grade 12 and leave school? Write a brief outline of what you intend to do next year – where you will live, what you will study or what work you will do, and so on.
2. Prepare a budget that covers your projected expenses for next year. Use suitable categories and be as specific as possible about your expenses.

For example, if *study at college* is in your outline for the year, list the college fees, costs of study materials, transport fees or residence fees, and so on. Do research to find the exact cost or a good estimate for each item.

3. Use your income-and-expenditure statement from 5.3 Assignment to calculate how much your living expenses for next year will be. Decide whether the expense items will stay the same, and whether the amount for each item will increase, stay the same or decrease.
4. If you will move out of home next year, do research to find out what the cost will be to stay in a residence, share a flat with friends, or rent a room in someone's house.
5. Compile a list of all the sources of income you expect to have next year. Give accurate amounts or good estimates for each source of income.
6. Calculate whether you will have a surplus or a shortfall in your budget for the year.
7. If you will have a budget shortfall, write a brief explanation of how you could increase your income possibilities for the year, or reduce your expenses.

» **Finance:** Investigation 4

Budget for a dream holiday

Prepare a budget for your dream holiday anywhere in the world. Do research on the internet and at travel agencies to collect accurate information about the cost of the holiday – all travel, accommodation, tours, passport and visa costs, insurance and any other expenses.

Your budget should include copies of all the documents you have used to find costs for the trip – travel brochures, visa forms, adverts for local tours and accommodation, and so on.

ZANZIBAR MINI-STAY

3 DAYS, FR R2042

- **2 nights accommodation in Stone Town**
- **Return transfers from Dar es Salaam**
- **1 Zanzibar Island activity**
- **Daily breakfast**

If you're short on time but don't want tomiss out on a visit to this incredible paradise, a 'mini-stay' is the perfect option. We take care of all your transport from Dar es Salaam (including ferries) so there is absolutely no hassles and you can concentrate on relaxing. You'll get an included activity in the package, choose from a Stone Town tour or Spice tour if you choose 'Basic' accommodation and a Dhow Sailing cruise or Swimming with Dolphins if you choose 'Classic' accommodation. Fill the rest of your days lazing up on the beach and swimming in the turquoise sea. Please note this package is also available as a 4 day option.

SWIM WITH DOLPHINS

FULL DAY, FR R607

From the village of Kizimkazi on the south coast of Zanzibar, there's the opportunity to go out in a local boat and swim with the large resident pods of humpbacked and bottlenose dophins. Grab your flippers and hoist yourself into the warm Indian Ocean while your friends stand ready with the camera. More than likely a friendly local will pop up next to you in the waves – it's easier than you think.

» **Finance:** Investigation 5

Analyse your local municipality's budget

If you are able to access your municipality's reports and budgets via the internet, complete part 1 of this investigation. If not, complete part 2 of the investigation. When you have done part 1 or part 2, complete part 3. Work with a partner.

Part 1

1. Do an internet search to find your municipality's most recent budgets and annual reports.
2. Analyse the budget for two consecutive years, and write a short report in which you explain what you noticed about the main items of income and expenditure in the budget, and how these increased, decreased or stayed the same from one year to the next.
3. If you are able to find an annual report that includes an income-and-expenditure statement for a specific year, compare this statement to the budget for the same year. List any income or expenditure items in the statement that are different from the budgeted amounts for the same items (for example, income from electricity service charges that was budgeted to be R20 billion, but that was actually R18 billion in the income and expenditure statement).

Part 2

1. Arrange a meeting with an official in your municipality who can give you information about the budgets and income-and-expenditure statements for the municipality.
2. Prepare a few questions to ask the official about how they draw up a budget each year.
3. Ask the official to show you examples of actual income and expenditure amounts that were different from the amounts budgeted for that year.
4. Find out what the municipality does if the income received in a year is less than the budgeted expenditure for that year.

Part 3

1. With your partner, make a list of the repair and maintenance work and new services that are needed in your community and that you think the municipality should provide (for example, fixing leaking pipes on council property to save water, placing speed bumps on neighbourhood roads to slow the traffic, clearing a piece of open ground to make a public sports field).
2. Rank the items on your list in order from most needed to least needed.
3. Estimate the cost of providing each item on your list. Your estimate can be a very rough one, but it should include a note explaining how you did your calculations for the estimate.
4. Study the municipal budget documents you found. Could the items on your list fit in any of the categories in the budget? (For example, new speed bumps could fit into a category such as traffic control or road safety.)
   - **a.** If each item could fit into an existing category, state what percentage increase in funds would have to be budgeted for that category to provide for the costs of the item.
   - **b.** By what percentage would the total municipal budget have to increase to cover the costs of all the items on your list?
   - **b.** If there is any item on your list that does not fit into a category in the budget, in the budget, discuss ways in which you could persuade the municipality to budget for this item in future.

» **Finance:** Investigation 6

A case study of a small business

Do this investigation with one or two learners in your class.

1. Identify a small business in your neighbourhood and ask the owner/manager if they are willing to share information about the business with you.
2. Prepare a list of questions that will help you to get the following information from the owner or manager:
   - **a.** total business expenses for a month, grouped in the categories fixed costs and running costs
   - **b.** total sales for the month – how many of each item or service the business sells per month
   - **c.** how the business sets the selling prices of its goods or services
   - **d.** actual prices of the main goods or services offered by the business.

   The owner or manager may not be able to give you exact totals for these amounts. Ask them to give you a reasonable estimate of each amount.
3. Using the information you gathered, write a short report about the business, with tables, equations and graphs where useful, to set out the following information:
   - **a.** an income-and-expenditure statement for the year
   - **b.** a budget for total annual sales income from the different goods and services offered, using the prices and sales quantities you found
   - **c.** a break-even analysis showing how many of all the items or services combined must be sold for the business to reach break-even point for the year
   - **d.** the approximate percentage profit that the business could be making for the year, based on the information you found
   - **e.** any comments you want to make about whether the business could earn more sales income if it changed its selling price or cost price for any of the goods or services it sells.

Term 2

» **Finance:** Assignment 2

Analyse information about long-term investment and debt/loan scenarios

1. The table gives information about a retirement annuity. Use it to answer the questions.

Retirement annuity number	90013#21
Date on which annuity commences	01 September 1997
Date on which annuity holder retires	01 September 2025
Annuity payment	R500,00
Payment frequency	Monthly
Projected value on retirement – minimum	R187 621,08
Projected value on retirement – maximum	R389 131,95

   - **a.** Over how many years does the annuity holder pay for this retirement annuity?
   - **b.** What is the total of all his payments?
   - **c.** What is **i** the highest **ii** the lowest amount of money he could expect to have available for his retirement from this annuity?
   - **d.** Could this amount of money be lower or higher than the amounts given in the table?

2. Use the funeral plan leaflet on page 195 in the Learner's Book to answer these questions.
   a. A Standard Bank customer who is married with three children aged 6 months, 5 years and 15 years takes out a FuneralPlan with the bank. If he lives for another 40 years, give his total premium payments.
   b. If the planholder dies two years after taking out the plan, what benefits will the bank pay to his family?
   c. If the planholder decides to include his father, his mother and his wife's mother in the plan, how much will he pay altogether as a monthly premium?
   d. What benefits will the plan pay out to his parents and his wife's mother, if he dies?
3. The table below sets out details of a funeral plan offered by another bank.

What are the benefits?

- The benefit is kept simple, giving you the choice of how to use it and therefore keeping you in control of your own plans
- Up to R120 000 accidental death benefit for the plan holder and spouse
- Whole life cover for children, as long as the plan remains in force
- In the event of death of the plan holder, a memorial benefit of R5 000 is payable in addition to the cash benefit
- 12 months free cover for the remaining members after the plan holder's death
- The plan pays out the cash benefit ranging from R5 000 to R60 000 in the event of death of any of the insured persons, including a R1 000 payout for stillborn for the plan holder or spouse (after the 26th week of pregnancy)
- Quick payouts
- No medicals required

What are the options and what will they cost?

The funeral plan provides flexibility by allowing you to choose who you want to cover as well as offering you different cover amount options to choose from.

Cover	Main member fee	Spouse fee
R5 000	R30.00	R13.00
R10 000	R40.00	R17.00
R15 000	R47.00	R22.00
R20 000	R55.00	R35.00
R30 000	R67.00	R44.00
R40 000	R79.00	R55.00
R50 000	R90.00	R64.00
R60 000	R102.00	R73.00

Cover	Extended Family fee		Parents fee	
	<65	>=65	<65	>=65
R5 000	R34.00	R60.00	R30.00	R55.00
R10 000	R60.00	R100.00	R55.00	R90.00
R15 000	N/A	N/A	R80.00	R130.00

Cover	Child fee
R5 000	R3.00
R10 000	R6.00

(*Source:* www.fnb.co.za/funeral-cover/funeral-plan.html)

   a. In the Family Package, how much will it cost a planholder every month to buy funeral cover worth R20 000 for herself and R5 000 for her children?

b. How much extra will it cost if she wants to include six extra family members in the plan?

c. Which is the best package option for a single person who wants family cover for himself and his parents?

d. If the single man is 35 years old and he has a maximum of R100 to spend every month, how much funeral cover can he buy for himself and his parents?

e. Compare the packages offered by the bank above with the funeral plan set out on page 195 in the Learner's Book. Which bank offers a better funeral plan? Explain your choice by giving examples of the different benefits and costs each plan offers.

4. The table below comes from a calculator tool offered by a bank to help people work out how much a home loan will cost them. Use it to answer the questions that follow.

Number of months of loan	12		clear
Interest rate	14.2	%	
Total amount of loan	96,000.00		calculate

Payment no.	Payment amount	Interest amount	Capital reduction	Balance due
1	R8,638.60	R1,136.00	R7,492.60	R88,507.40
2	R8,638.60	R1,047.34	R7,581.26	R80,926.14
3	R8,638.60	R957.63	R7,670.97	R73,255.16
4	R8,638.60	R866.85	R7,761.75	R65,493.42
5	R8,638.60	R775.01	R7,853.59	R57,639.82
6	R8,638.60	R682.07	R7,946.53	R49,693.29
7	R8,638.60	R588.04	R8,040.56	R41,652.73
8	R8,638.60	R492.89	R8,135.71	R33,517.02
9	R8,638.60	R396.62	R8,231.98	R25,285.04
10	R8,638.60	R299.21	R8,329.39	R16,955.65
11	R8,638.60	R200.64	R8,427.96	R8,527.69
12	R8,638.60	R100.91	R8,527.69	R0.00

Totals for year 1

You will spend **R 103,543.20** for the whole year
R 7,543.20 will go towards **INTEREST**
R 96,000.00 will go towards the **CAPITAL**

a. What is **i** the interest rate **ii** the term **iii** the monthly instalment of this bond?

b. How much money will the bond make available towards the cost of a property?

c. How much interest will the borrower have paid altogether by the end of the term?

d. At the end of the seventh month, how much money will the borrower still owe the bank?

e. If the borrower paid off this amount in total at the end of the seventh month, how much interest would he save?

f. Which patterns do you notice in the interest amounts and the amounts of capital paid, month-by-month for the duration of the bond?

Finance: Investigation 7

Compare bank fee options offered to students

Most banks are keen to attract students to open accounts at their bank because, in general, people who have an account at one bank seldom change to another bank later in life. The bank that offers low fees and special deals to students knows that these students will spend more on bank fees, interest payments, and so on once they start earning an income, buying a house or doing other long-term bank transactions.

1. Working with a partner, collect tariff lists and marketing brochures from at least four banks about the student account options they offer. You will find this information on bank websites and at local branches of the banks.
2. Use this information to compare the different options. Your comparison should cover not only the fees charged per transaction, but also extra services offered by each bank – for example, free cellphone banking and a student loan account.
3. Use tables of values, graphs and any other suitable means to show examples of how one bank's options are better or worse those that of another bank.
4. Decide which student account option you would choose if you were a college or university student, and write a short report in which you explain the reasons for your choice.

Finance: Assignment 3

Compare interest owing on credit card and loan accounts

Mzwandile and Thobeka both have to spend R5 000 on textbooks and laboratory equipment for their university studies.

Mzwandile sees the advertisement on the next page, and decides to apply to this bank for a loan of R5 000 that is repayable after 12 months.

Thobeka has a credit card, and she decides to buy the books and equipment with her card instead of taking out a bank loan. She buys the books on 1 February, and plans to repay the R5 000 into her credit card account by 31 January of the following year. The debit interest rate on her credit card is 22,1% p.a., and the terms and conditions of this credit card state:

> You will be liable to pay interest to us in respect of each transaction, calculated monthly on the daily balances as set out on your statement.

1. Use tables of values to calculate the real cost of the R5 000 for:
   a. Mzwandile
   b. Thobeka
2. Draw graphs of both tables of values on the same set of axes.
3. Is there any time during the 12-month period when the real cost of Thobeka's credit card debt will be lower than the real cost of Mzwandile's loan up to that point, or Mzwandile's loan up to that point will be lower than Thobeka's credit cared debt? Explain.

Get an Absa Personal or Micro-Loan

Just like you, your Absa Loan has a birthday – but you get the gift! Take up a new Absa Personal or Micro-Loan and you'll get 1% of your loan value back, every year.

Bank on five more reasons to be with Absa:

1. Borrow from R3 000 to R150 000
2. Get it paid into any bank account
3. Pay it back over 12 to 84 months*
4. Apply at any Absa branch, or using Absa Cellphone or Internet Banking
5. Choose Credit Life Cover for added peace of mind

Apply now at your nearest Absa branch, logon to www.absa.co.za, call 0860 100 372 or apply from your cellphone at www.absa.mobi

*Terms and conditions apply. All loans are subject to credit assessment.

Simply bring the following documentation to finalise your application:

- Green bar-coded Identity Document
- Latest proof of income
- Proof of physical address (e.g. utility bill not older than 3 months)
- 3 months' bank statements (not required for Absa customers)

Absa Bank Ltd. Reg No 1986/004794/06.
Authorised Financial Services Provider. Registered Credit Provicer. Reg No NCRCP7.

Micro-Loans Repayment Table

Loan Amount	Term											
	12		24		36		48		60			
	Instalment with Credit Life	Total Amount Repayable	Instalment with Credit Life	Total Amount Repayable	Instalment with Credit Life	Total Amount Repayable	Instalment with Credit Life	Total Amount Repayable	Instalment with Credit Life	Total Amount Repayable		
R5 000	R588	R7 055	R354	R8 498	R277	R9 970	R239	R11 472	R217	R13 002		
R10 000	R1 064	R12 766	R621	R14 909	R475	R17 108	R403	R19 362	R361	R21 670		
R15 000	R1 540	R18 476	R888	R21 320	R673	R24 245	R568	R27 252	R506	R30 338		

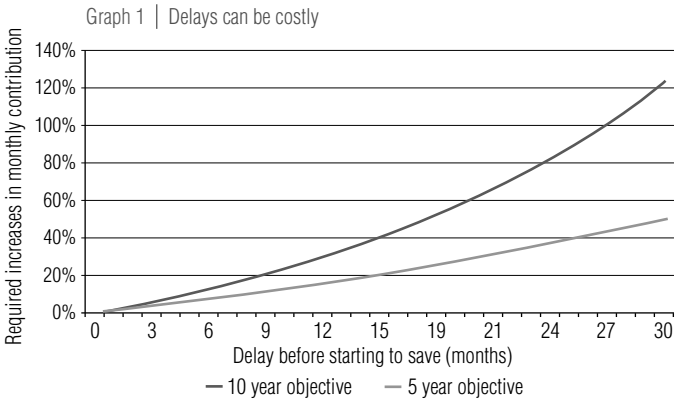
All loan applications are subject to the National Credit Act, 34 of 2005,and subject to credit approval by Absa Bank Limited.
Your loan interest rate and initiation fee will be determined by your individual risk profile.
The figures displayed above are for illustrative purposes only, calculated at a rate of 18% with an initiation fee of R600 and include Credit Life protection.
Credit Life protection is optional and provides cover against death, disability, dread disease and retrenchment (terms and conditions apply).

Analyse information about a long-term investment

Financial service providers publish newsletters to advise their customers about how to invest. The article that follows offers advice about long-term savings. Use it to answer the questions that follow.

The cost of waiting to save

Graph 1 | Delays can be costly



Whether you want to save for your retirement, a child's education or an overseas trip, starting now can significantly reduce the cost of reaching your goals. Each month that you put off saving in favour of spending either increases the amount that you will have to save in the remaining months, or it pushes the date at which you will reach your goal further into the future. Starting to save earlier allows you to gain maximum benefit from the power of compounding.

The black line on graph 1 shows that if investments are growing at 9% per year and you need to meet your objective (goal) in 10 years' time, delaying saving for just 18 months will increase the amount you need to save per month by more than 25%. The lighter line on the graph shows that when your timeframe for reaching your objective is 5 years, an 18-month delay in starting to save means you will have to save 50% more per month to reach your target amount.

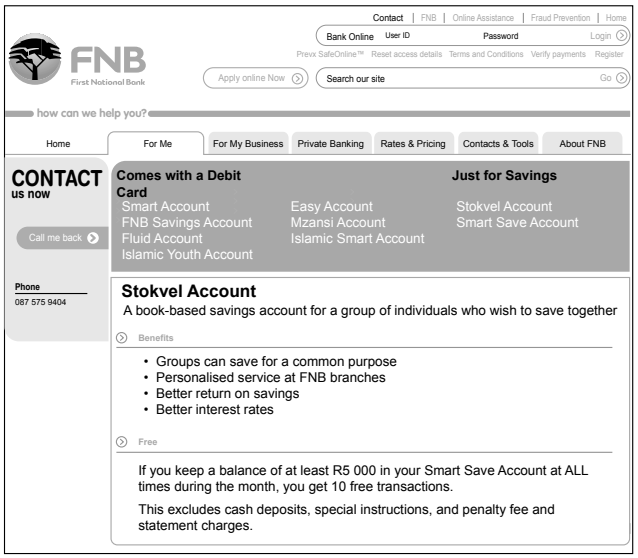
(*Source:* simplified extract from *GrayIssue* 6 July 2012, Issue no. 133, published by Allan Gray Pty Ltd.)

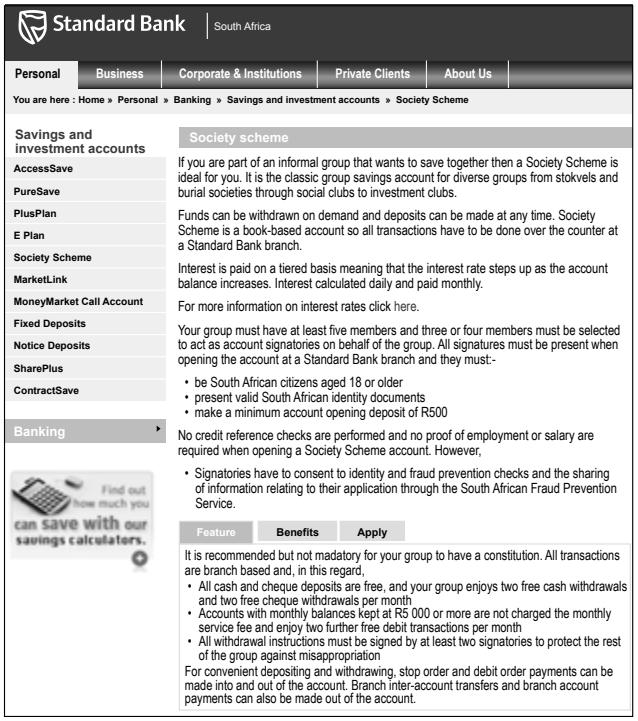
1. Explain in your own words what the numbers along the horizontal axis of the graph represent.
2. Explain in your own words what the percentages along the vertical axis represent.
3. A child was born in March 2013. When she is born her parents decided to take out an education savings policy as a way to save money to pay for her education, which would start in 2018. They waited until she was six months old before they started paying monthly premiums on the policy. By what percentage must they increase their monthly contribution to still reach their investment goal by 2018?
4. If they wanted to pay R250 into the policy each month, how much must this amount increase to still meet their goal?
5. A first-year college student decided to start saving for a round-the-world trip five years later. She could afford to pay a monthly contribution of R500 into an investment account. Because of unexpected college expenses, she started making contributions two years later than she planned. How much must she contribute to the policy each month if she still wants to reach her savings target?
6. The article above assumes that investments are growing at 9% per year. If the investments are growing at a lower rate (for example, 6% per year) should you save more money or less money each month to be able to reach your target amount by the term of the policy?

Compare bank accounts suitable for stokvel investment

Many banks now offer savings accounts aimed specifically at stokvels and other savings groups. The group is allowed to act as one collective accountholder, and the bank fees and interest rates are designed to be suitable for many small deposits made by members over time.

Working with a partner, investigate the investment options that three different banks offer to stokvels.





Absa Club Account

Designed for groups, such as Stokvels or Burial Societies, that need a simple and convenient way to administer their collective savings. You need only R50,00 to open the account and no monthly administration fee is payable. With tiered interest rates, the more you save the greater your returns. Interest is calculated daily and paid into the account monthly, and your money is immediately available from any branch. A key benefit of the Absa Club Account is that the first deposit per month is free of charge. This product is not card-based thus no card-type transactions are permitted.

Transaction Type	Fee
Monthly Fees	
Monthly Administration Fee	**No charge**
Deposits	
Cheque Deposit: Branch Counter	R11,00
Cheque Deposit: Absa ATM	**No charge**
Cash Deposit: Branch Counter	R485 + R1,15/R100
Cash Deposit: Absa ATM	N/A
Cash Withdrawals	
Branch Counter	R27,00 + R1,15/R100 (max. R500)
Absa ATM	N/A
Point-of-Sale (POS)	N/A
Absa-supported ATM	N/A
Saswitch ATM	N/A
Overseas ATM/POS	N/A
Post Office Terminal	N/A
Purchases	
Prepaid Top-up at Absa ATM or POS	N/A
POS – Local	N/A
POS – Overseas	N/A
Account Payments and Funds Transfers	
Account Payments • Branch Counter • Absa ATM	 R27,00 N/A
Debit and Stop Orders • Internal Debit Orders • External Debit Orders • Stop Orders	 R3,85 R7,15 **No charge**
Funds Transfers • Branch Counter • Absa ATM	 R27,00 N/A
CashSend™ (Absa ATM)	N/A

Transaction Type	Fee
Balance Enquiries	
Branch Counter	R2,45
Absa ATM	N/A
Absa-supported ATM	N/A
Saswitch ATM	N/A
POS	N/A
Post Office Terminal	N/A
Statement Fees	
Branch Counter Full Statement	R8,00
Absa ATM Ministatement	N/A
Absa CAT Terminal Full Statement	N/A
Mailed Statement	R8,00
eStatement[1]	**No charge**
Copies of Statements (per Statement) • Less than 4 months old • 4 months or older	N/A R12,50 R32,00
Administration Fees	
Bank Cheque	R65,00
Stop Payment Instruction (Debit Orders/Bank Cheque)	R30,00
Special Clearance	R65,00
Debit Card Replacement Fee	N/A
Other Fees	
Notification Fee (SMS or E-mail)[2]	**No charge**
Dishonoured/Returned Payment	R36,00
Declined Fee (Insufficient Funds) • Absa ATM • Absa-supported ATM • Saswitch ATM • POS • Post Office Terminal	 N/A N/A N/A N/A N/A
Returned Cheque Deposit	R65,00

1. Describe each account's main features.
2. Explain how this account is (or is not) more suitable for a stokvel group than an individual savings or investment account.
3. Compare the different accounts you have analysed, and explain how they are similar or differ from each other. Use examples of stokvel investment amounts to show how each account's fees and/or interest rates will affect the stokvel's money.

Analyse how inflation will affect different goods and services in your budget

In Finance: Investigation 3, you compiled a personal budget for the year after you complete Grade 12. Update this budget by adjusting the cost of each item to allow for inflation. Use the table below as a guideline. It shows a breakdown of how certain items and groups of items could increase in price, based on past inflation rates for these items.

Product group	Inflation rate for this product group	Inflation rates for items within the product group
Food	+10,7%	Prices show average inflation increases within the food group, although the price of meat, oils and fats increase at the fastest rate.
Housing and utilities	+6,6%	Water: + 9,2% Electricity: + 17,4%
Transport	+6,8%	Petrol: + 21,6% Public transport: + 13%
Education	+8,6%	Primary, secondary and tertiary education show similar inflation rates.

(*Source:* adapted from www.lrs.org.za/docs/LRS%20Inflation%20Monitor%20January%20 2012%20at%20270212.pdf)

Analyse how inflation affects people in different income categories

Read the paragraph and the table below and answer the questions that follow.

Food, housing and utilities, and transport are items that households, especially poorer households, cannot easily avoid. Poorer households spend a higher proportion of their total income on these items than more affluent households. This means that poorer households will feel the effect of inflation more strongly as they attempt to buy essential goods and services. This is also reflected in the fact that the inflation rate for poor households was almost 2% higher than the average national inflation rate of 6,3% in 2012.

The table below provides a picture of the inflation rate for different expenditure groups from the lowest income to highest income and the impact of inflation rate for these groups. The very low group experienced an inflation rate of 8,1%, higher than the national inflation rate of 6,3%, while the very high group had an inflation rate of 6,7%.

Income groups	Monthly expenditure	Inflation rate January 2012
National average		6,3%
Very low	Up to R1 213 per month	8,1%
Low	R1 213 up to R1 939 per month	7,8%
Middle	R1 940 up to R3 062 per month	7,4%
High	R3 063 up to R6 596 per month	7,2%
Very high	R6 596 and more	6,7%

1. The first row of the table shows that the national inflation rate for 2012 was 6,3%. Which income group experienced an inflation rate closest to the national average?
2. Which income group experienced the highest inflation rate for the year?
3. If a family budgeted about R2 050 per month for household expenses, by how much did this amount need to increase in 2012 so that they could buy everything in their budget?
4. If the inflation rate for people in the high income group was 7,2% in 2012, by how much did their purchasing power decrease in that year? (Give your answer in rand, not as a percentage.)
5. Give an example to explain the statement, 'Poorer households spend a higher proportion of their total income on food than more affluent households'.
6. The table below sets out the government social grants paid to some South Africans in 2011 and 2012.
   a. Calculate the percentage increase in each grant from 2011 to 2012.
   b. Did the increases allow each type of grant to maintain the same purchasing power in 2012 as it had in 2011? Explain.

Type of grant	2011 amount	2012 amount
Old age pension (people over 75)	R1 160,00	R1 220,00
Disability grant	R1 140,00	R1 200,00 (maximum)
Child support grant	R260,00	R280,00
Foster child grant	R740,00	R770,00

Finance: Assignment 6

Analyse how inflation affects pensioners

Read the article below and answer the questions that follow.

Pensioners spend a greater share of their income on housing and utilities than even the richest 20% of the general population does. Health-related costs make up 1,5% of the national CPI basket of goods, but 2,4% of the pensioners' basket.

	Inflation 2003 to 2011
Average pensioner inflation	6,0%
Average general inflation rate	5,2%
Difference	0,7%
Difference compounded over 10 years	7,4%
Difference compounded over 20 years	15,2%
Difference compounded over 30 years	23,7%
Additional savings required as percentage of savings	7,8%
Additional savings required as percentage of salary	1,0%

1. Write a sentence in which you describe how the general inflation rate changed from 2009 to 2011.
2. Write a sentence in which you compare the changes in pensioners' inflation to general inflation for the same period.
3. Was there any time when pensioners experienced lower inflation than the general public?
4. In the period from 2003 to 2011, by what percentage did employed people need to increase their savings so that they would have the same purchasing power in spite of inflation?
5. In this period, by what percentage did pensioners need to increase their savings to keep the same purchasing power in spite of inflation?
6. How easy is it for pensioners to increase the amount they save every month or every year? Explain your answer.
7. Why do pensioners tend to experience inflation rates that are different from the inflation experienced by the general population? Give an example to explain your answer.

Finance: Investigation 10

Linking income to the inflation rate

1. The extract from a news report below quotes a former South African Minister of Finance about how workers can protect themselves against inflation. Read the article and answer the questions that follow.

Inflation should not erode wages, says Manuel

15 May 2008 – Staff Reporter

South Africa's Finance Minister Trevor Manuel said on Thursday that it was important to ensure that inflation did not erode workers' salaries.

Manuel told journalists at the launch of South Africa's 2008 tax season, 'You can't in an environment where inflation is above 8% ask workers to take a 4% increase". South Africa's labour unions have indicated they would ask for double-digit wage increases this year to cushion workers against rising prices.

(*Source:* Adapted from www.mg.co.za/article/2008-05-15-inflation-should-not-erode-wages-says-manuel)

a. How do workers try to maintain the purchasing power of their wages and salaries when prices increase as a result of inflation?

b. If employers offer their staff a salary increase of 4% when the inflation rate is 8%, how will this affect the workers' purchasing power? Included in your answers, give an example of how this would work.

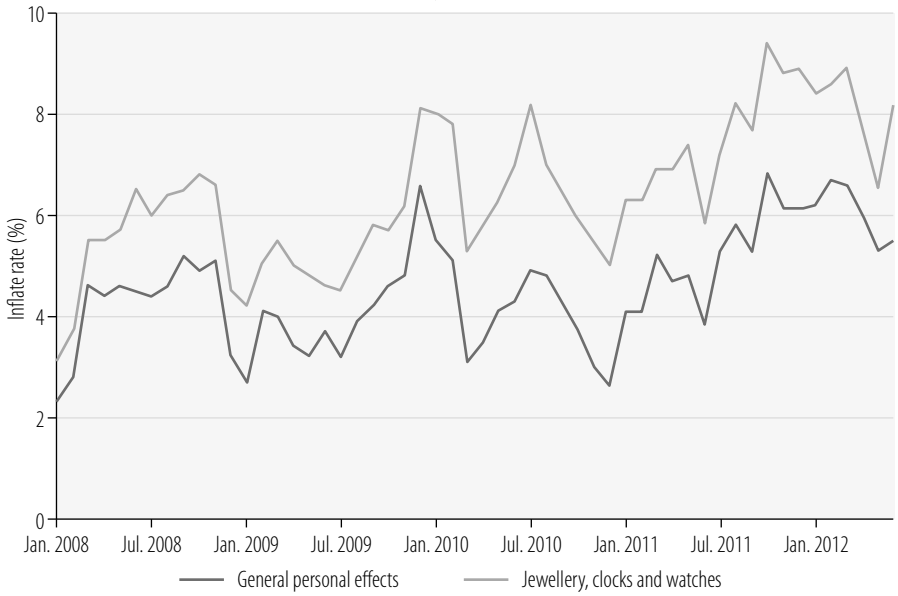
c. Give an example of how a worker's weekly wage would need to change so that an annual inflation rate of 7,2% did not damage the purchasing power of their wage.

d. Find out what percentage wage or salary increases workers in a local business have received over the past two years. Compare these increases with the inflation rate for the past two years, which you will find on the website of Stats SA (www.statssa.gov.za). Write a brief report in which you compare the workers' rate of pay increase with the inflation rate for the same period.

2. Some people buy goods such as jewellery, art and property that increase in value over time. They hope that the value of the goods will increase at a higher rate than inflation. Then, if they need to sell the goods to get cash, they will get enough cash back so that they will have the same level of purchasing power as they had when they bought these items.

The graph compares the inflation rate of jewellery with the inflation rate for personal effects (all personal goods such as clothing, phones and cameras).

The inflation rate for jewellery and general personal effects



a. Write a short paragraph in which you describe how the inflation rate for jewellery, clocks and watches compared with the inflation rate for general personal effects during the period 2008 to 2012.

b. If Pat bought a gold ring in July 2009 for R3 500, approximately how much would the same ring cost in January 2012?

c. If Ismael bought a pair of shoes for R1 500 in July 2009, approximately how much would the same pair of shoes cost in January 2012?

d. Collect information from a local jeweller about how prices have changed for certain items of jewellery over the last three years. Choose five or six specific items to compare (for example, a gold ring with one diamond and a pair of gold earrings) and compile a table of selling prices for three years. Calculate and draw a graph to show the average inflation rate for the jewellery items over this period.

e. Collect information about the prices of five or six items of clothing, or electric/electronic goods, for the same three years. Calculate the average inflation rate for these goods and draw a graph of this rate on the same set of axes as the jewellery graph above.

f. Write a sentence in which you compare the two inflation rates.

3. The graph of house prices on page 243 in the Learner's Book shows that property prices increase at rates that are not always the same as the general inflation rate. Over time most houses increase in value, because inflation means that it costs more and more to build a new house. But if you sell a house, there is no guarantee that the amount you receive will have enough purchasing power to match the higher cost of living caused by inflation.

This table sets out average changes in house prices in a few major South African metropolitan areas over a five-year period.

Annual percentage price change					
City	**2007**	**2008**	**2009**	**2010**	**2011**
Pretoria	16,5	1,1	0,38	9,8	2,2
Cape Town	10,4	2,46	0,13	9,5	2,2
Greater Johannesburg	15,5	3.25	3,1	2,8	6,9
Durban/Pinetown	14,9	0,07	6,5	8,7	9,6
East London	11,7	12,8	1,16	3,07	17,0
Bloemfontein	22,6	1,8	0,6	15,8	2,7
Port Elizabeth/Uitenhage	12,7	3,07	8,8	9,9	4,1

a. Work out the average house price inflation rate across all these metropolitan areas in each of the five years.

b. Use these averages to draw a graph of house price inflation in South African metropolitan areas from 2007 to 2011.

c. Work out the average house price inflation rate in each metropolitan area for the same five-year period.

d. If the general inflation rate in South Africa over this five-year period was 6,3%, in which metropolitan areas would income from property sales have had the same (or more) purchasing power in 2011 as in 2007?

d. Consider a house in each metropolitan area that cost R1 000 000 in 2007. If that house were sold at the end of 2007, how much would the new owner have paid for it?

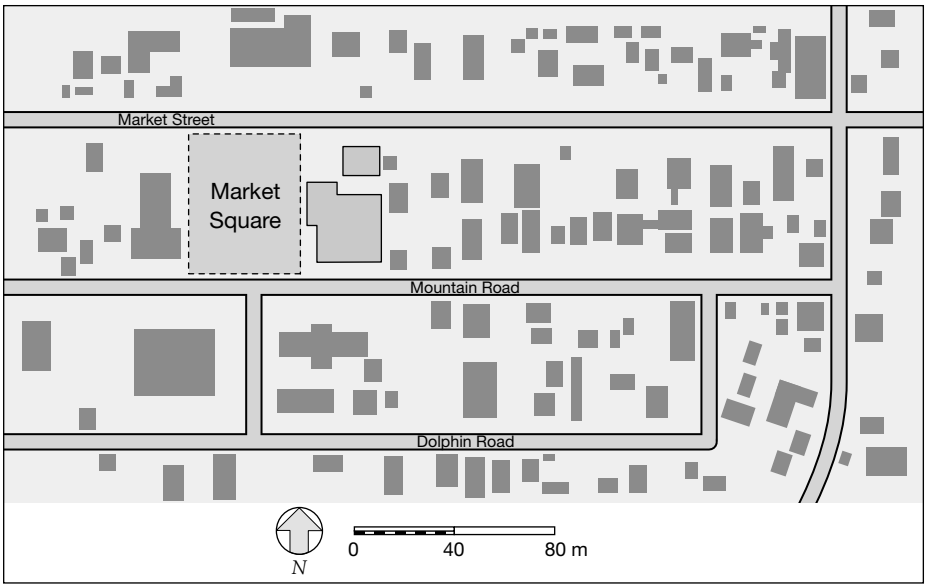
e. If the same house were sold again at the end of 2008, 2009, 2010 and 2011, what would the cost of the house have been at the end of 2011?

f. Find out how house prices have changed in your neighbourhood over the last five years. What has the average house price inflation rate been for this period? Is this greater or smaller than the average inflation rate in South Africa, for the same period?

Measurement: Assignment 1

Estimate the lengths of roads and pavements in a settlement

The street plan shows part of an informal settlement where the municipality plans to upgrade the roads. Use the scale bar on the plan to help you answer the questions.



(*Source:* 'The Desmond and Leah Treatment Centre, Masiphumelele', *Digest of South African Architecture 2004/2005* p. 81)

1. Estimate the total length of all the roads marked on the plan. Explain how you worked out your estimation. How accurate do you think your estimated measurement is?
2. The municipality plans to create pavements along both sides of every road. What will the total estimated length of the pavements be?
3. The pavements will be edged with concrete kerbstones. If one kerbstone is 0,6 m long, how many kerbstones will be needed for this job?
4. If the kerbstones are priced at R750 per 500 m, what will the municipality have to pay for the total quantity of concrete kerbstones they need?
5. There is a chance that this part of the upgrading could be delayed by one to two years, even though it is in this year's budget. How would you advise the municipality to adjust its budgeted amount for the kerbstones, in case there is a delay?

Measurement: Investigation 1

Complete a travel logbook

1. Complete at least one month of travel information using a copy of the logbook on page 291 in the Learner's Book. Also insert the vehicle details at the top of the logbook page. (Note that the dates are for Mondays. You may complete details for any four weeks – not only those listed in the logbook.)

   The best way to complete the logbook will be for you to find a person who runs a small business and can help you fill in real distances travelled for business and personal reasons, week by week. If the person you ask does not keep a log of accurate distances, help them estimate at least one week's distances.

Base your estimate on:

- the odometer reading at the start of the week
- the odometer reading at the end of the week
- a list of all the trips that the vehicle made for business and personal reasons during the week.

If you cannot find a business manager or owner to help you, work with a partner in your class to estimate distances for at least one month of the logbook, for an imaginary business owner. For example, a young mother with three children, who runs a business from home that makes gift boxes and fancy stationery to sell to the public.

2. Use the details in your logbook to work out the average kilometres travelled by this vehicle, per month and per year, for business and for personal reasons. Add rows for all the weeks that have not been listed in the logbook.
3. Use the average annual distances travelled for business and personal reasons to work out what proportion of the total distance covered in a year is for business reasons, and what proportion is for personal reasons.

Measurement: Assignment 2

Calculate vehicle operating costs

1. Use the average distance travelled in a year that you calculated in question 2 of Measurement: Assignment 1 above to work out the operating cost of the vehicle for which you gave information in the logbook. To do this use the method you learned to use in Grade 11:

Step 1
Find out what the average petrol consumption is for this car (ask the owner, look it up on a website, or ask a dealer who sells this make of car). For example: a car has average petrol consumption of 7,8 ℓ/100 km. This means it uses about 7,8 ℓ to travel 100 km. So it uses 7,8 ÷ 100 = 0,078 ℓ to travel 1 km.

Step 2
Use a rate calculation to work out how much petrol this vehicle uses to travel the average distance travelled in a year. For example: the car with average petrol consumption of 7,8 ℓ/100 km travels 47 350 km in a year.

The car uses 0,078 ℓ to travel 1 km.
So it will use 0,078 × 47 350 to travel 47 350 km.
0,078 × 47 350 = 3 693,3 ℓ (Use a calculator to make it easier to work with the decimal values.)

Step 3
Use the current price of petrol to work out what 3 693,3 ℓ of petrol costs.

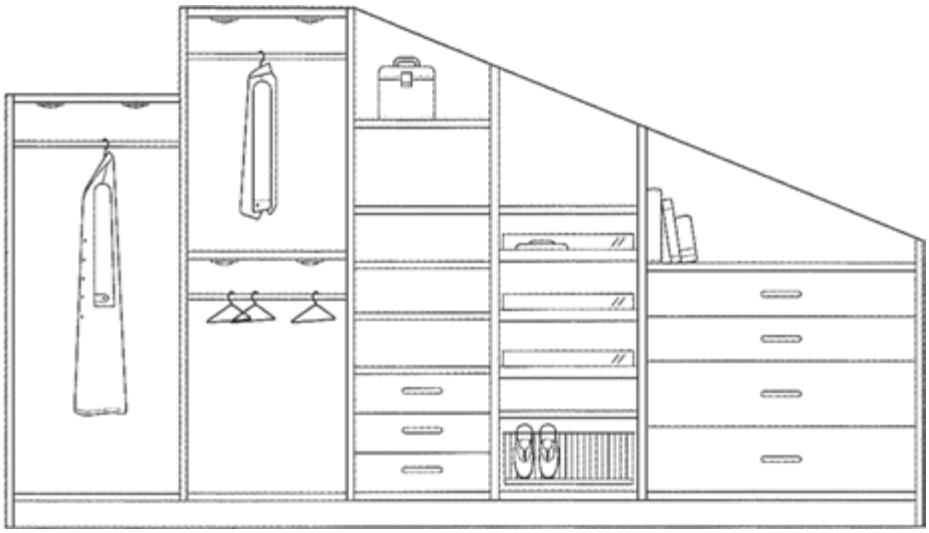
The changing price of petrol means this method will not give you a completely accurate cost. To get an idea of the total cost, either find out what the petrol price was in each month of the year and work out the average for the year, or make a reasonable estimate of an average price, based on the current petrol price.

2. Now use the method set out in the AA tool op pages 292 to 294 in the Learner's Book to calculate operating costs for the same vehicle. You will need to find the purchase price and engine capacity of the vehicle from the owner. If you invented a vehicle for your logbook, decide what type of vehicle it is, how much it cost you, and what its engine capacity is.
3. Compare your answers to questions 1 and 2 above. What do they tell you about the benefits of using each method to calculate operating costs?

» **Measurement:** Assignment 3

Calculate materials and budget for a built-in wardrobe unit

When she leaves school, Lerato moves into a new loft room built into the roof of her parents' house. The room has no furniture in it, and parts of the walls slope steeply because they follow the line of the roof. Lerato sees the drawing below in a magazine, and asks her father if he will pay a cabinetmaker to build something like this for her new living space. Her father says he will do so, if the whole unit can be built for less than R2 000.



1. The length of the wall where this unit will go is 3,2 m. The ceiling height at its top point is 2,1 m. Use these measurements to decide on lengths for all the parts of this wardrobe unit that match the proportions of the different sections as shown in the diagram.
2. Decide how deep the wardrobe unit should be – how far it should jut out into the room.
3. Use your measurements to calculate the total length of construction material that will be needed for the sides, top, shelves and drawer of the unit.
4. Do research to find out which materials would be suitable for this unit, and what the cost will be of each type of material. If the materials only come in standard sizes, will there be any wastage of unused materials once the unit is built?
5. Is it possible to construct the whole unit for under R2 000? Report on your findings.
6. Suggest ways in which the size of the unit sections could be changed to reduce the cost, or to use the material most effectively (with the least amount of unused material left over).

» **Measurement:** Investigation 2

Growth patterns in children aged 2 to 20

The charts on the next two pages show the percentile curves for height (stature) and weight (mass) for both males and females aged 2 to 20. The scales are given in both metric and imperial units.

The mean weight (in kilograms) and height (in centimetres) of a representative sample of urban learners is given in the table that follows the two charts.

2 to 20 years: Boys
Stature-for-age and Weight-for-age percentiles

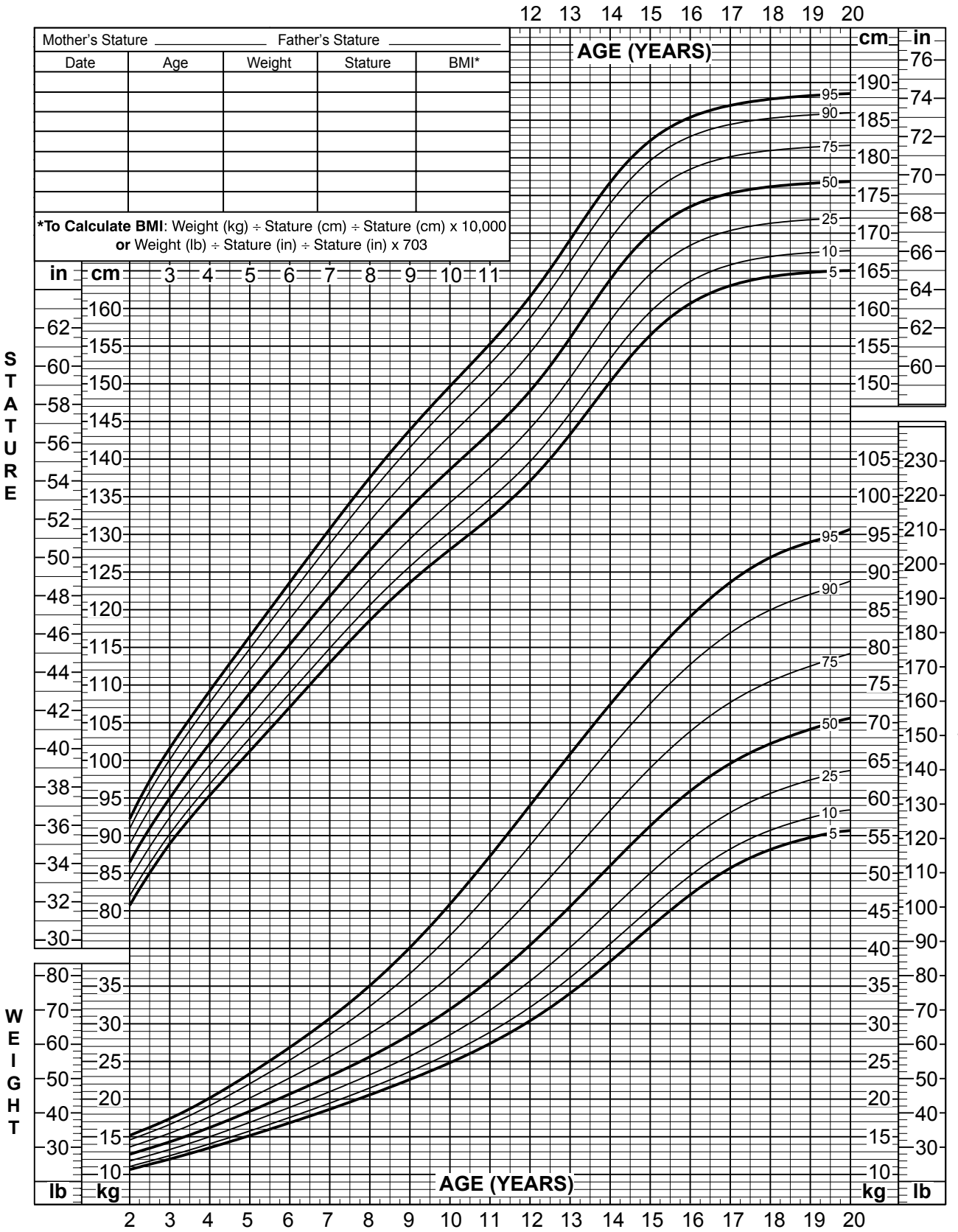
NAME _____

RECORD # _____

Mother's Stature _____ Father's Stature _____

Date	Age	Weight	Stature	BMI*

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 11/21/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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2 to 20 years: Girls
Stature-for-age and Weight-for-age percentiles

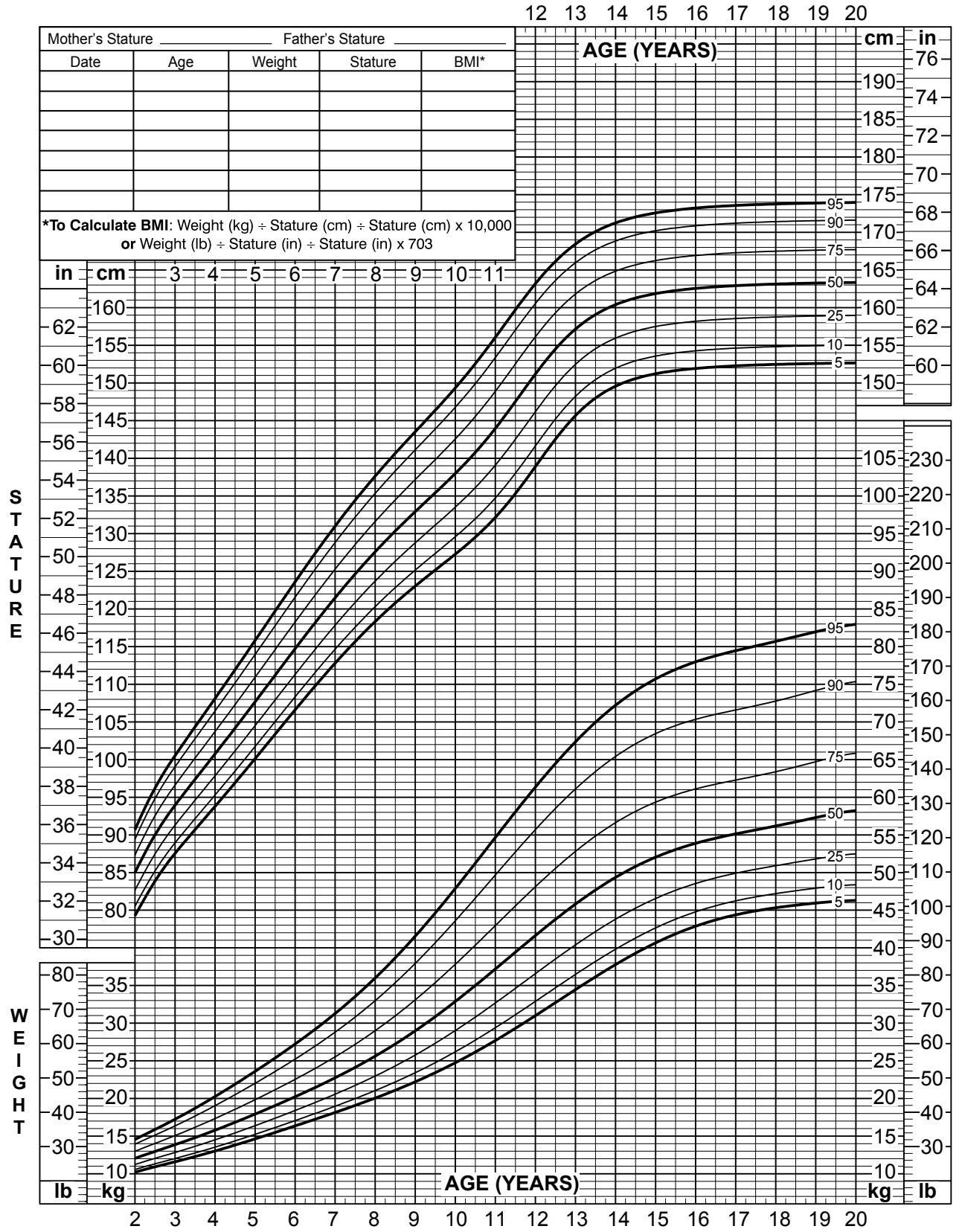
NAME _____

RECORD # _____

Mother's Stature _____ Father's Stature _____

Date	Age	Weight	Stature	BMI*

***To Calculate BMI**: Weight (kg) ÷ Stature (cm) ÷ Stature (cm) x 10,000
or Weight (lb) ÷ Stature (in) ÷ Stature (in) x 703



Published May 30, 2000 (modified 11/21/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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Age (to nearest whole year)	12	13	14	15	16	17
Male learners						
Mean weight (kg)	42,98	50,00	56,66	61,61	64,82	68,03
Mean height (cm)	152,3	159,8	166,7	171,4	174,3	175,5
Female learners						
Mean weight (kg)	46,59	50,46	54,18	56,47	58,06	57,57
Mean height (cm)	155,2	158,8	161,4	162,2	162,7	162,9

1. Plot the data for each age group on the appropriate graph.
2. Comment on what you can learn about the sample group from this data.
3. Collect height and mass data from a sample of male and female learners in each age group in your school or community.
   a. Calculate the mean mass and height for each age group.
   b. Plot the data on the appropriate graph (see the graphs above).
   c. Comment on what this graph shows.
   d. How does the data from your sample compare with the data given in the table above? Suggest reasons for any differences.
4. Calculate the mean BMI for each age group using the data given in the table.
   a. Use the BMI percentile graphs in this unit and plot the BMI for each group.
   b. How does the plotted mean BMI for girls compare with the median BMI for each age group?
   c. What percentage of 17-year old boys has a BMI above the mean for this sample group?
5. Use the given data together with the data you collected and write a short paragraph in which you compare the growth patterns and BMI findings for male and female learners.

» **Measurement:** Assignment 4

Prepare a set of instructions about ***E coli*** and water purification

The people who are most at risk of *E coli* infection may not be able to read warnings and instructions in English. Follow the steps in this assignment to prepare an easy-to-use leaflet for them.

Step 1

Plan a page of the leaflet on which you set out the information given on pages 330 to 332 in the Learner's Book about *E coli* in a few pictures that tell the same story. (For example, you could include a picture of sewage spilling out of a broken pipe into a stream near a few houses, followed by a picture of a child playing in the river, with a big cross through this picture to show that children must not play in contaminated water.)

Step 2

Design a clear sign that could be placed near any contaminated water, warning people not to use the water. The sign should include wording in at least two South African languages.

Step 3

Convert the written guidelines for purifying water into a set of visual instructions (pictures) that show each step in the process. Use a few words or numbers where necessary to explain what must be done.

Step 4

Translate the guidelines above into at least one other South African language, and present them in an easy-to-read leaflet. If you do not speak more than one language, find a partner in the class to work with you, or find someone in your neighbourhood who can translate the English text into another local language.

» **Measurement:** Assignment 5

Collect information about temperatures in your home fridge and plan your food storage accordingly

Use the cold storage guidelines on pages 338 and 339 in the Learner's Book to analyse the temperatures in the fridge and/or freezer at home, and decide on the best ways to pack food into it. You will need a thermometer that shows temperatures between about 10 °C and –20 °C.

Take all the temperature readings in the same fridge, so that you can compare the changes. (Different fridges may have slightly different temperature ranges, because of wear and tear or different cooling mechanisms.)

1. On a specific date, take a reading of the temperature in the following parts of the fridge. For each measurement, put the thermometer in position and leave it there for at least five minutes. It is not necessary to move the food in the fridge out of the way. Record your measurements for each position in the fridge.
   - **a.** the top shelf, near the back
   - **b.** the top shelf, near the front
   - **c.** the bottom shelf, near the back
   - **d.** the bottom shelf, near the front
   - **e.** an inside rack of the door
   - **f.** one of the drawers at the bottom of the fridge
2. Empty the fridge and let it stand empty for half an hour and then repeat the measurements. (You may need to store some of the foods in a neighbour's fridge for an hour.) Record your new measurements.
3. Repack the food in the fridge. Follow the guidelines in the table on page 338 in the Learner's Book as far as possible. Leave the fridge like this for at least an hour, then repeat the measurements and record them.
4. Draw up a table to set out your three sets of measurements, so that you can easily compare how the temperatures did or did not change in each situation. The table could look like the one that follows.

	Fridge packed as usual	Fridge emptied	Fridge repacked according to guidelines
Position	**Temperature in degrees Celsius (°C)**		
top shelf, near back			
top shelf, near front			
bottom shelf, near back			
bottom shelf, near front			
inside rack of door			
drawer at bottom of fridge			

5. Write a few sentences in which you give guidelines about where to pack different types of food in your fridge so that it maintains the most suitable temperatures for storage.

» **Measurement:** Investigation 3

Tiling a given area

Example 3 on pages 354 to 356 in the Learner's Book sets out the basic method for calculating quantities and costs for a tiling project. It made allowance for grouting between tiles. Use this method, or any other method for this investigation.

1. Choose an area in your house that could be tiled (for example, the wall above the kitchen sink or the stove, a bathroom or kitchen wall or a floor in one of the rooms).

2. Measure the dimensions of this area accurately, and prepare a sketch diagram to show the shape of the area and all the measurements of its sides. Calculate the total area of the surface you want to tile.

3. Visit one or two tile suppliers and choose tiles that would be suitable. (Some tiles are only suitable for walls, as they are not strong enough to be used for floors.) Measure each tile accurately. Write down the price of each tile you choose and find out how the tiles are sold (how many tiles are in one box). Ask the assistant how much grouting and tile adhesive you would need for the area you want to cover, and calculate the costs.

Or, if there is no tile supplier near where you live, do research on the internet to find what different sizes of floor or wall tiles cost, how much grouting and adhesive are needed for different areas, and what these items cost. Or find a builder or home do-it-yourself person in your neighbourhood, and ask them to help you estimate costs and tile sizes for your project.

4. Using the information you collected above, work out how many tiles are needed to cover the area you chose for this investigation. Indicate if some tiles will need to be cut so that the whole area can be tiled.

5. Prepare a budget for this tiling project, including the following.
- **a.** the cost of tiles
- **b.** the cost of grouting and adhesive
- **c.** the total cost, including VAT

6. Calculate how many uncut tiles will be left over after the area has been tiled.

What is the replacement cost of your home?

In this investigation, you will find out what it would cost to rebuild your house. This is a complex investigation, and you may prefer to work in groups of two or three learners. If you work in groups, choose one group member's house for the investigation.

Many people take out insurance cover for their cars, jewellery, cellphones, household goods and office equipment. The insurance cover is based on what the owner says the goods are worth.

If you are a home owner, or if you are paying monthly instalments on a bond (home loan), you also need to take out insurance on the building. This means that you will have insurance cover if the building is destroyed or badly damaged by a fire or a rock fall, or if building collapses or there is another disaster.

The insurance for a building is based on the **replacement cost** of the building – this is the cost of rebuilding the same structure, with the same materials. It only refers to the walls, floors, windows, doors, roof, plumbing and electric wiring of the building. All the interior features such as carpets, furniture and kitchen equipment are not covered by this insurance.

Building costs increase annually and every few years, home owners need to check whether the replacement cost stated in their insurance policy is still be enough to rebuild the house. Every year the management of blocks of flats looks at the replacement costs at which the building is insured to see if they should update the total value of the insurance.

To investigate the replacement costs of the building where you live, follow the steps that follow.

Part 1

1. Draw a simple plan of the building, showing the walls, doors and windows.
2. Measure the dimensions of each wall, door and window, and add these to the plan.
3. Calculate the area of each wall in the building, and find the total area of all the walls.
4. Calculate the total area of all the windows and doors in the building, and subtract this total from the total wall area. This gives you the actual wall area.

5. Calculate the total floor area of the house.
6. If you are investigating a house, estimate the area of the roof that covers the house. (Hint: Compare the surface area of the roof with the total floor area of the building. Let the roof estimate be slightly more than the area of the floors.)
7. If you are investigating a flat, calculate the total area of all the ceilings in the flat. (Hint: Think about whether the ceilings are the same size as the floors in all the rooms.)
8. Measure the perimeter around all the walls in each room, excluding the doors. Add the perimeters to get a very rough estimate of how long the electric cables will be.

Part 2

Now you have the measurements of the main elements, use each measurement to find the quantities and costs of materials needed to rebuild these elements.

Note: You can take your calculations of the walls, floors, roof, window and door sizes to a building supply store and ask the staff to help you if necessary.

1. Find out how many bricks are needed to rebuild all the walls, and what they will cost.
2. Find out what it will cost to replace the floors with new flooring of the same type the house has now.
3. Find out what doors and windows of the same sizes and types will cost.
4. Investigate the types of roofing material that could be used to replace your existing roof, and get an estimate of what this would cost.
5. Ask an electrician to help you estimate the cost of rewiring a building with the dimensions on your plan, and the perimeters of the walls you calculated.

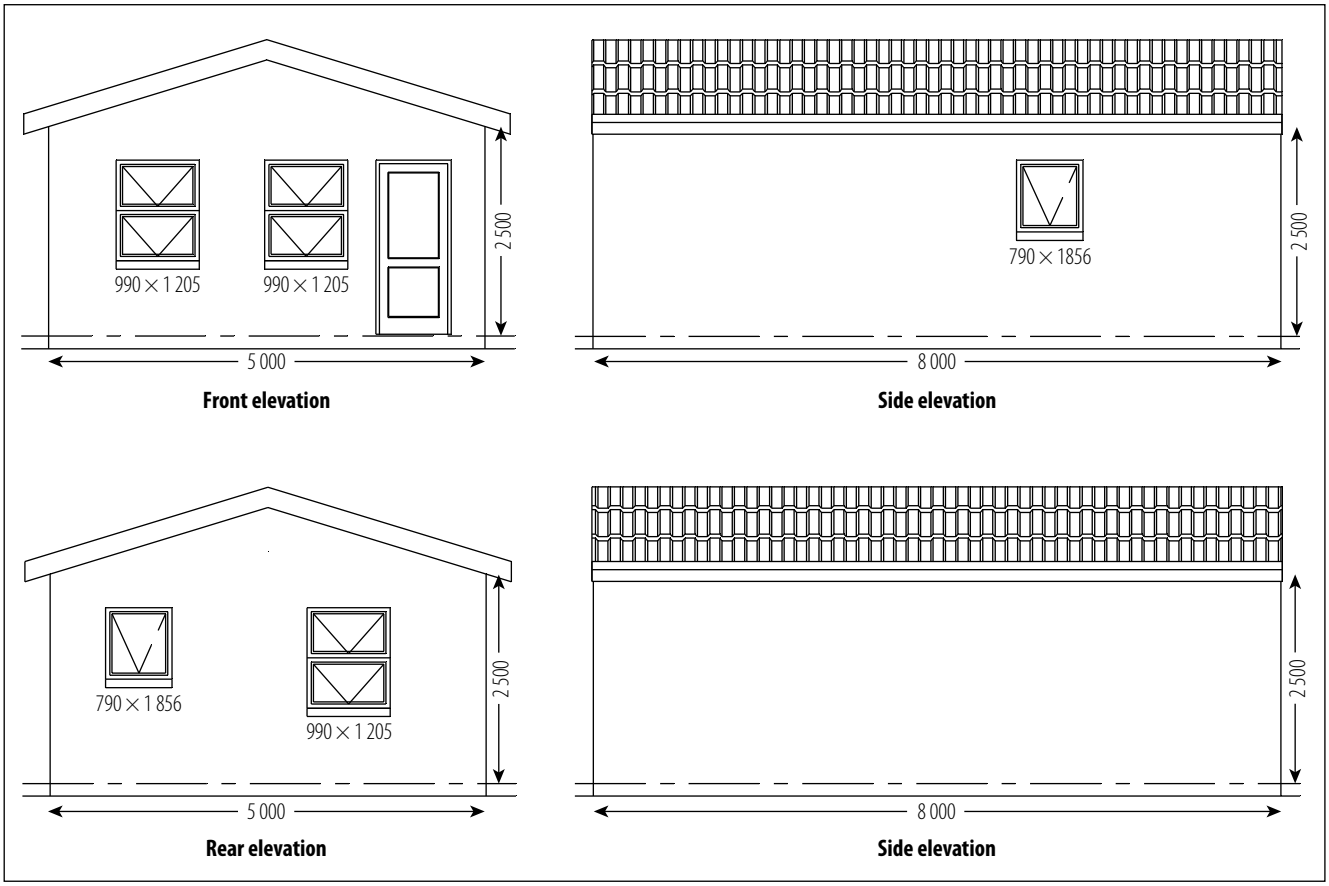
Part 3

1. Use all the information you collected in part 2 and calculate the estimated total cost for rebuilding your house.
2. Find out what the current replacement cost is for your house as given in the insurance policy. If your parents cannot give you this information, ask the home loans department at a bank to help you.

   Or, if your house is not covered by building insurance, or you cannot find information about replacement costs for the building, ask a local builder to estimate what it would cost to rebuild your home (excluding labour costs). Compare this estimate with your calculations.
3. Write a short report about the information you found about the following:
   a. the replacement costs of the building
   b. the problems of trying to work out how much it will cost to replace a building. How difficult was it to find out what materials cost? What problems did you experience when trying to measure the quantities of materials needed? Was it difficult to get help from the experts you approached?
4. Based on your report, take part in a class discussion about whether people ought to know what the replacement values of their houses are and how to help them get access to this information.

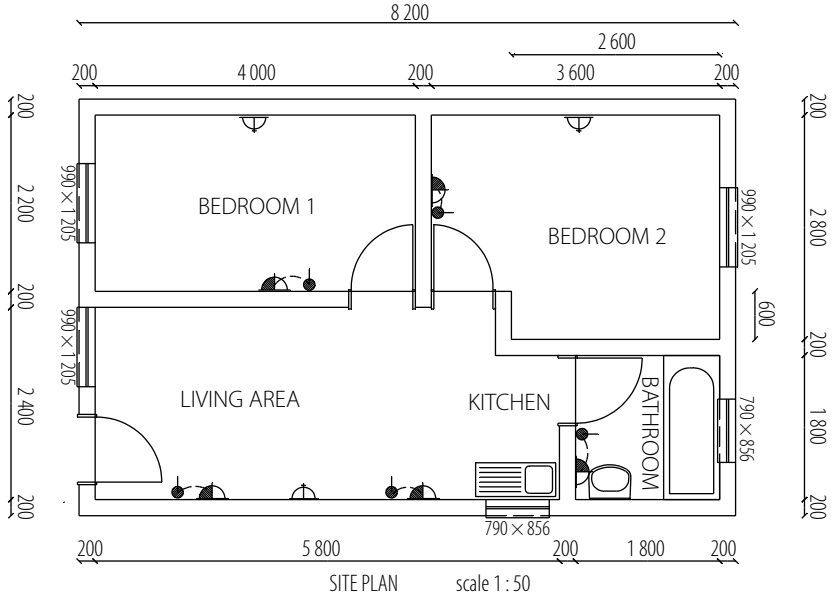
Quantities and costs of materials for a low-cost house

Below is the plan for a low-cost (RDP) house with a total floor area of 40 m^2. The owners received a subsidy of R62 000 to construct the top structure (walls and roof, wiring and plumbing). Investigate whether the subsidy will cover all the construction costs.



(*Source:* www.stumbelbloc.com/downloads/stumbelbloc-cottage-RDP-elevations)

1. Use the plan to work out the dimensions of the exterior walls, windows and doors of the house. All measurements on the plan are given in millimetres.
2. Find out from a building supply store which materials could be used for the walls, roof, doors and windows, and the costs of these materials. Ask the staff to advise you about the approximate quantities of bricks and roof tiles for a house of this size. If they cannot help you, consult a local builder for advice before you go back to the building supply store to find the costs of the materials.
3. Use this information to calculate the basic top structure cost. If there are different options for some materials (such as brick or timber for the walls, timber or steel for the window frames), calculate the costs for one or more combinations of materials that you think will be suitable.
4. Research the cost of installing basic plumbing and electrical wiring. To do this, you will need to show the plan to a plumber and an electrician who usually work on building projects, and ask how they estimate costs. Show them the plan above, and also the plan on the next page of the interior of the house.
5. Use the information you collected to draw up a budget for the construction of the house. Will the subsidy be enough to cover costs?



(*Source:* www.stumbelbloc.com/downloads/stumbelbloc-RDP-plan-scale-1_50.pdf)

Term 3

» **Finance:** Assignment 7

Calculate personal income tax for an employee

Below is the payslip received by Miriam Mufamadi at the end of April.

EMPLOYEE CODE	10	EMPLOYEE NAME	M. Mufamadi		
DESIGNATION		COST CENTRE	Sales		
COMPANY NAME	ABC Clothing			PERIOD	
PO Box 65				DATE	31/01/2012
Durban North				RATE	233.44
INCOME					
DESCRIPTION		QUANTITY	RATE	AMOUNT	
Gross salary				27 785.00	
GROSS PAY				27 785.00	
BENEFITS		**COMPANY CONTRIBUTIONS**			
Use of motor vehicle		660.00			
DEDUCTIONS					
DESCRIPTION		BALANCE	AMOUNT		
Pension		0.00	2 083.88		
PAYE Tax		0.00	4 898.00		
UIF Contribution		0.00	277.85		
TOTAL DEDUCTIONS			7 259.73		
LEAVE DAYS DUE	5	**NET PAY**	20 525.27		

1. Show how the tax amount on this payslip was calculated, using the following.
   - **a.** the tax tables on the next page that apply to monthly remuneration
   - **b.** tax brackets and formulae, as set out in the table in Term 3, Unit 1 in the Learner's Book.
2. In June Miriam receives a salary increase: her new monthly gross income is 29 452. How will this change the amount of PAYE deducted from her monthly pay?
3. Compare the amount of tax shown in the tax tables for Miriam's gross income in April with the amount of tax payable that you calculate using tax brackets and formulae. Find reasons for any differences that you see in the two tax values.

Remuneration			Annual Equivalent	Tax		
				Under 65	65 - 74	Over 75
R 25,094	-	R 25,144	R 301,428	R 4,607	R 4,075	R 3,897
R 25,145	-	R 25,195	R 302,040	R 4,623	R 4,090	R 3,913
R 25,196	-	R 25,246	R 302,652	R 4,638	R 4,105	R 3,928
R 25,247	-	R 25,297	R 303,264	R 4,653	R 4,121	R 3,943
R 25,298	-	R 25,348	R 303,876	R 4,669	R 4,136	R 3,959
R 25,349	-	R 25,399	R 304,488	R 4,684	R 4,151	R 3,974
R 25,400	-	R 25,450	R 305,100	R 4,699	R 4,167	R 3,989
R 25,451	-	R 25,501	R 305,712	R 4,714	R 4,182	R 4,004
R 25,502	-	R 25,552	R 306,324	R 4,730	R 4,197	R 4,020
R 25,553	-	R 25,603	R 306,936	R 4,745	R 4,213	R 4,035
R 25,604	-	R 25,654	R 307,548	R 4,760	R 4,228	R 4,050
R 25,655	-	R 25,705	R 308,160	R 4,776	R 4,243	R 4,066
R 25,706	-	R 25,756	R 308,772	R 4,791	R 4,258	R 4,081
R 25,757	-	R 25,807	R 309,384	R 4,806	R 4,274	R 4,096
R 25,808	-	R 25,858	R 309,996	R 4,822	R 4,289	R 4,112
R 25,859	-	R 25,909	R 310,608	R 4,837	R 4,304	R 4,127
R 25,910	-	R 25,960	R 311,220	R 4,852	R 4,320	R 4,142
R 25,961	-	R 26,011	R 311,832	R 4,867	R 4,335	R 4,157
R 26,012	-	R 26,062	R 312,444	R 4,883	R 4,350	R 4,173
R 26,063	-	R 26,113	R 313,056	R 4,898	R 4,366	R 4,188
R 26,114	-	R 26,164	R 313,668	R 4,913	R 4,381	R 4,203
R 26,165	-	R 26,215	R 314,280	R 4,929	R 4,396	R 4,219
R 26,216	-	R 26,266	R 314,892	R 4,944	R 4,411	R 4,234
R 26,267	-	R 26,317	R 315,504	R 4,959	R 4,427	R 4,249
R 26,318	-	R 26,368	R 316,116	R 4,975	R 4,442	R 4,265
R 26,369	-	R 26,419	R 316,728	R 4,990	R 4,457	R 4,280
R 26,420	-	R 26,470	R 317,340	R 5,005	R 4,473	R 4,295
R 26,471	-	R 26,521	R 317,952	R 5,020	R 4,488	R 4,310
R 26,522	-	R 26,572	R 318,564	R 5,036	R 4,503	R 4,326
R 26,573	-	R 26,623	R 319,176	R 5,051	R 4,519	R 4,341
R 27,644	-	R 27,694	R 332,028	R 5,372	R 4,840	R 4,662
R 27,695	-	R 27,745	R 332,640	R 5,388	R 4,855	R 4,678
R 27,746	-	R 27,796	R 333,252	R 5,403	R 4,870	R 4,693
R 27,797	-	R 27,847	R 333,864	R 5,418	R 4,886	R 4,708
R 27,848	-	R 27,898	R 334,476	R 5,434	R 4,901	R 4,724
R 27,899	-	R 27,949	R 335,088	R 5,449	R 4,916	R 4,739
R 27,950	-	R 28,000	R 335,700	R 5,464	R 4,932	R 4,754
R 28,001	-	R 28,051	R 336,312	R 5,479	R 4,947	R 4,769
R 28,052	-	R 28,102	R 336,924	R 5,495	R 4,962	R 4,785
R 28,103	-	R 28,153	R 337,536	R 5,510	R 4,978	R 4,800
R 28,154	-	R 28,204	R 338,148	R 5,525	R 4,993	R 4,815
R 28,205	-	R 28,255	R 338,760	R 5,541	R 5,008	R 4,831
R 28,256	-	R 28,306	R 339,372	R 5,556	R 5,023	R 4,846
R 28,307	-	R 28,357	R 339,984	R 5,571	R 5,039	R 4,861
R 28,358	-	R 28,408	R 340,596	R 5,587	R 5,054	R 4,877
R 28,409	-	R 28,459	R 341,208	R 5,602	R 5,069	R 4,892
R 28,460	-	R 28,510	R 341,820	R 5,617	R 5,085	R 4,907
R 28,511	-	R 28,561	R 342,432	R 5,632	R 5,100	R 4,922
R 28,562	-	R 28,612	R 343,044	R 5,648	R 5,115	R 4,938
R 28,613	-	R 28,663	R 343,656	R 5,663	R 5,131	R 4,953
R 28,664	-	R 28,714	R 344,268	R 5,678	R 5,146	R 4,968
R 28,715	-	R 28,765	R 344,880	R 5,694	R 5,161	R 4,984
R 28,766	-	R 28,816	R 345,492	R 5,709	R 5,176	R 4,999
R 28,817	-	R 28,867	R 346,104	R 5,725	R 5,192	R 5,015
R 28,868	-	R 28,918	R 346,716	R 5,743	R 5,210	R 5,033
R 28,919	-	R 28,969	R 347,328	R 5,760	R 5,228	R 5,050
R 28,970	-	R 29,020	R 347,940	R 5,778	R 5,246	R 5,068
R 29,021	-	R 29,071	R 348,552	R 5,796	R 5,264	R 5,086
R 29,072	-	R 29,122	R 349,164	R 5,814	R 5,281	R 5,104
R 29,123	-	R 29,173	R 349,776	R 5,832	R 5,299	R 5,122

R 24,074 - R 29,173

TABLE C

SARS

EFFECTIVE DATE
2012.06.08

MONTHLY DEDUCTION TABLES

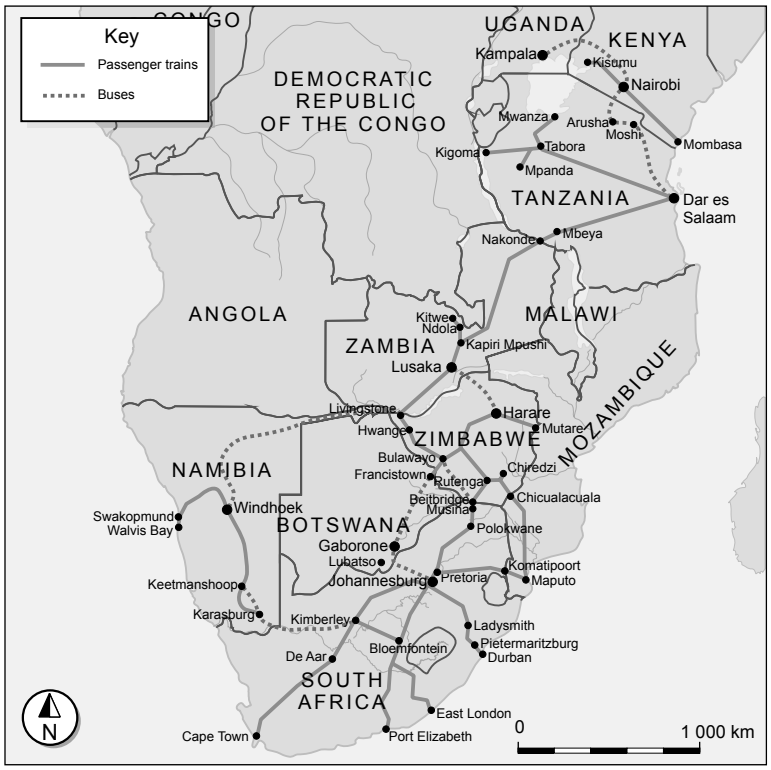
Remuneration			Annual Equivalent	Tax		
				Under 65	65 - 74	Over 75
R 29,174	-	R 29,224	R 350,388	R 5,850	R 5,317	R 5,140
R 29,225	-	R 29,275	R 351,000	R 5,868	R 5,335	R 5,158
R 29,276	-	R 29,326	R 351,612	R 5,885	R 5,353	R 5,175
R 29,327	-	R 29,377	R 352,224	R 5,903	R 5,371	R 5,193
R 29,378	-	R 29,428	R 352,836	R 5,921	R 5,389	R 5,211
R 29,429	-	R 29,479	R 353,448	R 5,939	R 5,406	R 5,229
R 29,480	-	R 29,530	R 354,060	R 5,957	R 5,424	R 5,247
R 29,531	-	R 29,581	R 354,672	R 5,975	R 5,442	R 5,265
R 29,582	-	R 29,632	R 355,284	R 5,992	R 5,460	R 5,282
R 29,633	-	R 29,683	R 355,896	R 6,010	R 5,478	R 5,300
R 29,684	-	R 29,734	R 356,508	R 6,028	R 5,496	R 5,318
R 29,735	-	R 29,785	R 357,120	R 6,046	R 5,514	R 5,336
R 29,786	-	R 29,836	R 357,732	R 6,064	R 5,531	R 5,354
R 29,837	-	R 29,887	R 358,344	R 6,082	R 5,549	R 5,372
R 29,888	-	R 29,938	R 358,956	R 6,100	R 5,567	R 5,390
R 29,939	-	R 29,989	R 359,568	R 6,117	R 5,585	R 5,407
R 29,990	-	R 30,040	R 360,180	R 6,135	R 5,603	R 5,425
R 30,041	-	R 30,091	R 360,792	R 6,153	R 5,621	R 5,443
R 30,092	-	R 30,142	R 361,404	R 6,171	R 5,638	R 5,461
R 30,143	-	R 30,193	R 362,016	R 6,189	R 5,656	R 5,479
R 31,724	-	R 31,774	R 380,988	R 6,742	R 6,210	R 6,032
R 31,775	-	R 31,825	R 381,600	R 6,760	R 6,228	R 6,050
R 31,826	-	R 31,876	R 382,212	R 6,778	R 6,245	R 6,068
R 31,877	-	R 31,927	R 382,824	R 6,796	R 6,263	R 6,086
R 31,928	-	R 31,978	R 383,436	R 6,814	R 6,281	R 6,104
R 31,979	-	R 32,029	R 384,048	R 6,831	R 6,299	R 6,121
R 32,030	-	R 32,080	R 384,660	R 6,849	R 6,317	R 6,139
R 32,081	-	R 32,131	R 385,272	R 6,867	R 6,335	R 6,157
R 32,132	-	R 32,182	R 385,884	R 6,885	R 6,352	R 6,175
R 32,183	-	R 32,233	R 386,496	R 6,903	R 6,370	R 6,193
R 32,234	-	R 32,284	R 387,108	R 6,921	R 6,388	R 6,211
R 32,285	-	R 32,335	R 387,720	R 6,939	R 6,406	R 6,229
R 32,336	-	R 32,386	R 388,332	R 6,956	R 6,424	R 6,246
R 32,387	-	R 32,437	R 388,944	R 6,974	R 6,442	R 6,264
R 32,438	-	R 32,488	R 389,556	R 6,992	R 6,460	R 6,282
R 32,489	-	R 32,539	R 390,168	R 7,010	R 6,477	R 6,300
R 32,540	-	R 32,590	R 390,780	R 7,028	R 6,495	R 6,318
R 32,591	-	R 32,641	R 391,392	R 7,046	R 6,513	R 6,336
R 32,642	-	R 32,692	R 392,004	R 7,063	R 6,531	R 6,353
R 32,693	-	R 32,743	R 392,616	R 7,081	R 6,549	R 6,371

Finance: Assignment 8

Plan a holiday in southern Africa

The map shows train and bus routes between a few towns and cities in southern Africa. The timetables and tariffs for most of the main routes are given in the tables below the map. Information is also given about the average cost of accommodation in a student hostel in each country. An exchange rate table gives the rates for a few southern African currencies as well as other currencies that are used in the tariff tables. If you want information about routes not shown below, use the internet to find up-to-date schedules and tariffs for trains or buses.

1. Use this information to plan a holiday route that satisfies the following conditions:
   - It can be completed in three weeks.
   - It costs less than R10 000 in total. Use estimated costs based on the included exchange rate table. (Where train or bus fares are not available for a section of your route, estimate these fares based on other fares given in the tables.)
   - You will spend time in at least three countries.
2. When you have planned the holiday, write a description of the route you propose from start to finish, with a table of costs (in rand).



Train schedules and tariffs

KENYA – trains

Nairobi ► Kisumu		
Days of running		**Monday & Friday**
Nairobi	depart	18:30
Naivasha	arr/dep	22:30
Nakuru	arr/dep	01:05
Kisumu	arrive	09:00

Kisumu ► Nairobi		
Days of running		**Monday & Friday**
Kisumu	depart	18:30
Nakuru	arr/dep	02:55
Naivasha	arr/dep	04:55
Nairobi	arrive	09:00

Fares	
1st class sleeper	3 010 Kenya shillings (£17/$32) per person sharing a 2-berth compartment including dinner & breakfast Children (aged 3–11) 1 925 Kenya shillings, children under 3 free
2nd class sleeper	2 210 Kenya shillings (£12/$24) per person sharing a 4-berth compartment including dinner & breakfast, or 1 685 shillings without dinner Children (aged 3–11) 1 525 Kenya shillings, children under 3 free
3rd class seat	500 Kenya shillings (£3/$5) Children (aged 3–11) 250 Kenya shillings, children under 3 free

KENYA – trains

Nairobi ► Mombasa		
Days of running		**Monday & Friday**
Nairobi	depart	19:00
Makindu	arr/dep	23:15
Mtito Andei	arr/dep	01:11
Voi	arr/dep	04:00
Mombasa	arrive	10:00

Mombasa ► Nairobi		
Days of running		**Monday & Friday**
Mombasa	depart	19:00
Voi	arr/dep	23:20
Mtito Andei	arr/dep	01:50
Makindu	arr/dep	03:50
Nairobi	arrive	10:00

Fares	
1st class sleeper	4 405 Kenya shillings (£38/$60) per person sharing a 2-berth compartment including dinner & breakfast This is the ticket office price, if you prebook through a reliable agency the fare is usually around $75 Children (aged 3–11) 2795 Kenya shillings, children under 3 free
2nd class sleeper	3 385 Kenya shillings (£29/$45) per person sharing a 4-berth compartment including dinner & breakfast, or 2 335 shillings without dinner This is the ticket office price, if you prebook through a reliable agency the fare is usually around $65 Children (aged 3–11) 2 285 Kenya shillings, children under 3 free
3rd class seat	680 Kenya shillings (£4/$6) Children (aged 3–11) 340 Kenya shillings, children under 3 free

KENYA – UGANDA buses
Departure schedule

Day/Night	From town	To town	Departure time	Estimated arrival time
Day	Nairobi via Busia	Kampala	07:00	20:00
Day	Nairobi via Malaba	Kampala	07:00	20:00
Day	Nairobi (Royal)	Kampala	07:15	20:00
Night	Nairobi via Busia	Kampala	19:30	09:30
Night	Nairobi via Malaba	Kampala	21:30	11:00

KENYA – TANZANIA buses

MOMBASA – DAR ES SALAAM (Tanzania) bus service...
A daily bus leaves Mombasa at 08:00, arriving Dar es Salaam at 18:00. Northbound, it leaves Dar es Salaam at 08:00, arriving Mombasa 17:30. Fare 1 600 Kenyan shillings or 19 000 Tanzanian shillings (£13/$21).

NAIROBI – ARUSHA – DAR ES SALAAM (Tanzania) bus service...
Akamba bus run a daily bus, departing Nairobi at 06:30 and arriving Dar es Salaam at 21:00. Fare in region of 3 200 Kenyan shillings or 38 000 Tanzanian shillings (£22/$38)

TANZANIA and TANZANIA – ZAMBIA trains

Dar es Salaam ► Kigoma/Mwanza			
Km	**Towns**	**1st & 3rd class**	**1st, 2nd & 3rd class**
0	Dar es Salaam depart	17:00 Tuesdays & Fridays	17:00 Tuesdays & Fridays
465	Dodoma	08:10 Wednesdays & Saturdays	08:10 Wednesdays & Saturdays
840	Tabora arrive	18:25 Wednesdays & Saturdays	18:25 Wednesdays & Saturdays
840	Tabora depart	20:10 Wednesdays & Saturdays	20:10 Wednesdays & Saturdays
1 256	Kigoma arrive	07:25 Thursdays & Sundays	-
1 220	Mwanza arrive	-	07:25 Thursdays & Sundays

Kigoma/Mwanza ► Dar es Salaam			
Km	**Towns**	**1st & 3rd class**	**1st, 2nd & 3rd class**
0	Mwanza depart	17:00 Thursdays & Sundays	18:00 Thursdays & Sundays
465	Kigoma depart	04:30 Fridays & Mondays	-
840	Tabora arrive	18:25 Fridays & Mondays	18:25 Fridays & Mondays
840	Tabora depart	20:10 Fridays & Mondays	20:10 Fridays & Mondays
1 256	Dodoma	07:25 Saturdays & Tuesdays	18:40 Fridays & Mondays
1 220	Dar es Salaam arrive	-	07:25 Saturdays & Tuesdays

Fares...	
One way per person	
Dar es Salaam to Kigoma	80 000 shillings (£28/$45) 1st class sleeper 40 000 shillings (£20/$35) 2nd class sleeper 19 900 shillings 3rd class seat

Dar es Salaam ► Mbeya ► Kapiri Mposhi				
Km	**Towns**	**Classes**	**Mukuba or Kilimanjaro express train 1s, 2s, 2, 3, M or R**	**Mukuba or Kilimanjaro ordinary train 1s, 2s, 2, 3, R**
0	Dar es Salaam	depart	15 50 Tuesdays	13:50 Fridays
849	Mbeya	arrive depart	13:08 Wednesdays 13:23 Wednesdays	14:10 Saturdays 14:40 Saturdays
969	Tunduma (frontier)	arrive depart	17:02 Wednesdays 17:17 Wednesdays	18:38 Saturdays 18:53 Saturdays
970	Nakonde	arrive depart	18:22 Wednesdays 18:47 Wednesdays	17:59 Saturdays 18:18 Saturdays
1 852	Kapiri Mposhi (new)	arrive	09:26 Thursdays	13:37 Sundays

Kigoma/Mwanza ► Dar es Salaam				
Km	**Towns**	**Classes**	**Mukuba or Kilimanjaro express train 1s, 2s, 2, 3, M or R**	**Mukuba or Kilimanjaro ordinary train 1s, 2s, 2, 3, R**
0	Kapiri Mposhi (new)	depart	18:00 Tuesdays	14:00 Fridays
882	Nakonde	arrive depart	08:39 Wednesdays 09:09 Wednesdays	09:13 Saturdays 09:23 Saturdays
883	Tunduma (frontier)	arrive depart	10:14 Wednesdays 10:29 Wednesdays	10:30 Saturdays 10:45 Saturdays
1 003	Mbeya	arrive depart	14:13 Wednesdays 14:29 Wednesdays	14:32 Saturdays 15:00 Saturdays
1 852	Dar es Salaam	arrive	12:35 Thursdays	15:48 Sundays

Fares...	
One way per person. Express train fares. Ordinary train fares are around 20% less	
Dar es Salaam to Kapiri Mposhi	82 600 shillings (£28/$48) 1st class sleeper 52 800 shillings (£21/$35) 2nd class sleeper
Dar es Salaam to Mbeya	22 400 shillings (£13/$21) 1st class sleeper 23 800 shillings (£9/$16) 2nd class sleeper
Kapiri Mphoshi to Dar es Salaam	1st class sleeper, express = 261 400 Zambian kwacha (£33/$55) 2nd class sleeper = 198 000 kwacha (£25/$50) 2nd class seat = 171 600 kwacha (£23/$44) 2rd class seat = 145 200 kwacha (£18/$35)
Kapiri Mphoshi to Mbeya	1st class sleeper, express = 118 8 Zambian kwacha (£14/$28) 2nd class sleeper = 86 600 kwacha (£12/$24) 2nd class seat = 79 100 kwacha (£11/$21) 2rd class seat = 71 400 kwacha (£10/$20)

Livingstone ► Lusaka ► Kitwe			
0 km	Livingstone	depart	20:00 Mon. & Fri.
467 km	Lusaka	arrive depart	13:20 Tues. & Sat. 14:20 Tues & Sat.
652 km	Kapiri Mposhi	arrive/depart	21:30 Tues & Sat.
785 km	Ndola	arrive/depart	02:50 Wed. & Sun.
851 km	Kitwe	arrive	06:00 Wed. & Sun.

Kitwe ► Lusaka ► Livingstone		
Kitwe	depart	08:45 Mon. & Fri.
Ndola	arrive/depart	11:30 Mon. & Fri.
Kapiri Mposhi	arrive/depart	16:42 Mon. & Fri.
Lusaka	arrive depart	23:50 Mon. & Fri. 00:30 Tues & Sat.
Livingstone	arrive	20:00 Tues. & Sat.

Fares...	
One way per person in economy class	
Livingstone – Lusaka	30 000 ZMK (£4/$7)
Livingstone – Kapiri Mposhi	43 000 ZMK (£6/$10)
Lusaka – Kapiri Mposhi	13 000 ZMK (£2/$3)

ZIMBABWE trains

Bulawayo ► Victoria Falls		
472 km, runs every day		
Bulawayo	Depart	19:30
Dete	Arrive/depart	08:00
Hwange	Arrive/depart	03:04
Victoria Falls	Arrive	09:00

Victoria Falls ► Bulawayo		
472 km, runs every day		
Victoria Falls	Depart	19:00
Hwange	Arrive/depart	22:22
Ete	Arrive/depart	00:50
Bulawayo	Arrive	07:00

Bulawayo ► Harare		
486 km, runs Mon., Thurs., Sat.		
Bulawayo	Depart	20:00
Harare	Arrive	08:00

Harare ► Bulawayo		
486 km, runs Tues., Fri., Sun.		
Harare	Depart	21:00
Bulawayo	Arrive	08:00

Fares
Fares are very cheap, even judged at the very poor official exchange rate. The one-way 1st class sleeper fare from Bulawayo to Victoria Falls is $12 (£17.50), bedding now $4 extra. A 2nd class sleeper is $8 (£5) without bedding.

Harare ► Mutare		
Runs Wed., Fri., Sun.		
Harare	Depart	21:30 day 1
Mutare	Arrive	05:25 day 2

Mutare ► Harare		
Runs Mon., Thur., Sat.		
Mutare	Depart	21:00 day 1
Harare	Arrive	05:20 day 2

The train has 1st and 2nd class sleepers and economy seats. Distance: 273 km

Fares: 1st class sleeper $7, 2nd class sleeper $5, economy seat $4

Bulawayo ► Chiredzi		
Runs Mon., Thur., Sat.		
Bulawayo	Depart	21:30 day 1
Rutenga	Arrive/depart	08:43 day 2
Chiredzi	Arrive	12:30 day 2

Chiredzi ► Bulawayo		
Runs Mon., Thurs., Sat.		
Chiredzi	Depart	15:20 day 1
Rutenga	Depart	20:05 day 1
Bulawayo	Arrive	07:45 day 2

The train has 1st and 2nd class sleepers and economy seats. Distance: 523 km

Fares: 1st class sleeper $14, 2nd class sleeper $10, economy seat $8

Bulawayo ► Beitbridge (border with South Africa)		
Runs Thursdays & Sundays		
Bulawayo	Depart	18:00 day 1
Beitbridge	Arrive	19:00 day 2

Beitbridge ► Bulawayo		
Runs Mondays & Fridays		
Beitbridge	Depart	21:00 day 1
Bulawayo	Arrive	08:45 day 2

The train has 1st and 2nd class sleepers and economy seats. Distance not known.

You can take local transport across the Beitbridge-Musina border and take the Shosholoza Meyl train from Musina to Pretoria & Johannesburg

Bulawayo to Chicualacuala & Maputo (Mozambique)

Bulawayo ► Chicualacuala		
Runs Wednesdays		
Bulawayo	Depart	12:15 Wed.
Chicualacuala (change trains)	Arrive Depart	13:00 Thurs.
Maputo	Arrive	05:49 Fri.

Chicualacuala ► Bulawayo		
Runs Wednesdays		
Maputo	Depart	13:00 Wed.
Chicualacuala (change trains)	Arrive Depart	03:42 Thurs.
Bulawayo	Arrive	03:52 Fri.

BOTSWANA trains

International trains

South Africa to Botswana by train

There are no trains from Botswana to South Africa, as the daily train to Mafikeng and weekly train to Johannesburg were withdrawn in 1999. However, you can take a comfortable train between Cape Town and Johannesburg. Then there's a daily bus between Johannesburg and Gaborone leaving Johannesburg at 14:30 and arriving Gaborone at 21:10. In the other direction, the bus leaves Gaborone daily at 08:30 and arrives in Johannesburg at 13:00. For times, fares and online booking see www.intercape.co.za.

Zimbabwe to Botswana by train

In 1999, the weekly Johannesburg–Gaborone–Bulawayo train was withdrawn and the daily Mafikeng–Gaborone–Bulawayo blue train was cut back to run purely within Botswana, Francistown–Gaborone–Lobatse. However, after an absence of six years, an international train service between Zimbabwe and Botswana restarted in June 2006, from Francistown to Bulawayo, three times a week.

Francistown ► Bulawayo		
Towns		Tuesday, Thursday, Saturday
Francistown	Depart	09:00.
Bulawayo	Arrive	15:00

Bulawayo ► Francistown		
Towns		Monday, Wednesday, Friday
Bulawayo	Depart	11:00.
Francistown	Arrive	16:30

NAMIBIA trains

StarLine passenger trains

Regular passenger trains marketed as StarLine are run by TransNamib, on the following routes:

- Windhoek to Swakopmund & Walvis Bay, runs daily except Saturdays, departs 19:55, arrives next day at Swakopmund 05:20 & Walvis Bay 07:15.
- Walvis Bay & Swakopmund to Windhoek, runs daily except Saturdays, departs Walvis Bay 19:00, Swakopmund 20:45, arrives Windhoek 07:00 next day.
- Windhoek–Keetmanshoop, runs daily except Saturdays, departs 19:40, arrives at 07:00 next day.
- Keetmanshoop–Windhoek, runs daily except Saturdays, departs 18:50, arrives 07:00 next day.
- Keetmanshoop–Karasburg – see the StarLine timetable.
- Windhoek–Tsumeb & Windhoek–Gobabis trains have been cancelled indefinitely as from January 2009.

Fares

Windhoek–Walvis Bay costs around N$80 (£5 or US$10), Windhoek–Keetmanshoop around N$87 (£5.50 or US$11), in economy class. Business class costs N$20 extra. However, fares vary from N80 – N$130 according to time of year and peak/off-peak. Children under 2 free, children 2, but under 12 half fare.

The Desert Express

TransNamib also operates a weekly tourist-orientated train between Windhoek and Swakopmund called the Desert Express. The train has sleepers (with en suite shower/toilet), a restaurant, bar & lounge. See www. desertexpress.com.na for more details.

- Departs Windhoek 12:00 (13:00 in summer) on Fridays, arrives Swakopmund 10:00 next day.
- Departs Swakopmund 15:00 on Saturdays, arrives Windhoek 10:30 next day.

Fares: N$1 850 (£115 or US$230) sharing, N$2 400 (£150 or US$300) single occupancy.

MOZAMBIQUE – SOUTH AFRICA and MOZAMBIQUE – ZIMBABWE trains

Johannesburg & Pretoria ► Maputo

1. **Take a South Arrican train from Johannesburg to Komatipoort.**
   This train is the Komati, run by Shosholoza Meyl. It currently runs three times a week and has economy seats only, there are no sleepers.

Johannesburg	Depart	18:10 Mon., Wed., Fri.
Pretoria	Depart	19:40 Mon., Wed., Fri.
Nelspruit (for Kruger Park)	Arrive/depart	04:15 next morning
Kaapmuiden	Arrive/depart	05:15 next morning
Komatipoort	Arrive	06:38 next morning

2. **Walk across the border from Komatipoort to Ressano Garcia.**
   It's only a few kilometres. The CFM train used to cross the border, but this proved too difficult for the customs authorities, so now you must walk across.
3. **Take a CFM train from Ressano Garcia to Maputo.**
   This train is run by CFM, the Caminhos de Ferro do Mozambique.
   It runs daily, and has 3rd class seats.

Ressano Garcia (Mozambique)	Depart	12:10 on Mon.–Fri., 12:30 on Sat & Sun.
Maputo (Mozambique)	Arrive	16:40 on Mon.–Fri., 17:20 on Sat. & Sun.

Maputo ► Pretoria & Johannesburg

1. **Take a CFM train from Maputo to Ressano Garcia.**
   This train is run by CFM, the Caminhos de Ferro do Mozambique. It runs daily, with 3rd class seats.

Maputo (Mozambique)	Depart	07:45 on Mon.–Fri., 08:00 on Sat & Sun.
Ressano Garcia (Mozambique)	Arrive	11:20 on Mon.–Fri., 11:35 on Sat. & Sun.

2. **Walk across the border from Ressano Garcia to Komatipoort.**
   It's only a few kilometres. The CFM train used to cross the border, but this proved too difficult for the customs authorities, so now you must walk across.
3. **Take a CFM train from Komatipoort to Johannesburg.**
   This train is the Komati, run by Shosholoza Meyl. It runs three times a week. It has economy seats only, there are no sleepers.

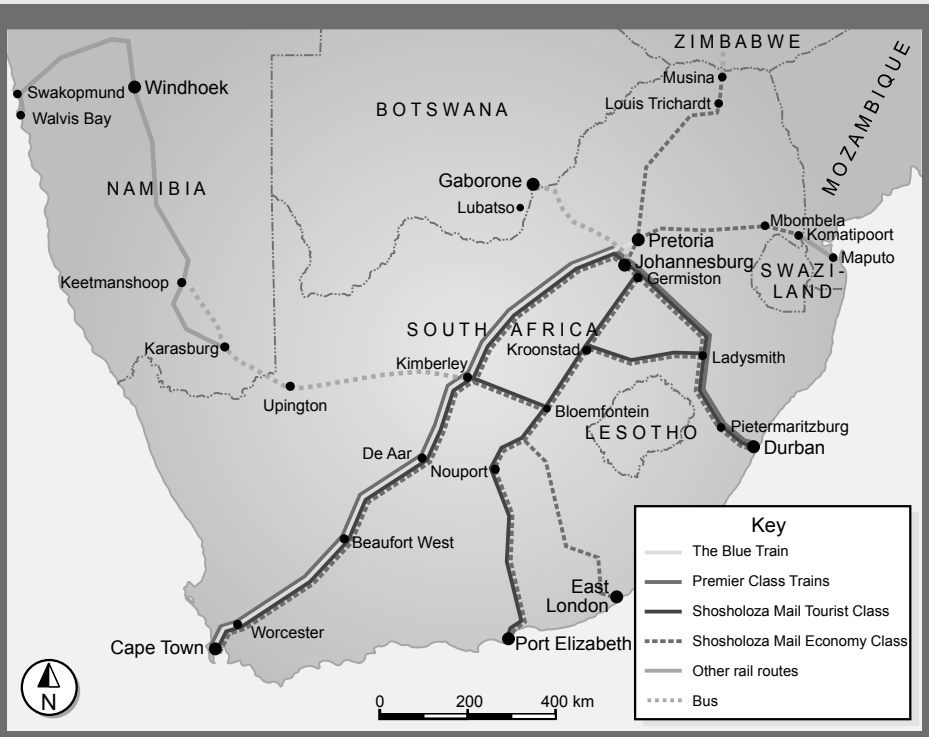
Komatipoort	Depart	18:00 Tues., Thurs., Sun.
Kaapmuiden	Arrive/depart	19:39 Tues., Thurs., Sun.
Nelspruit (for Kruger Park)	Arrive/depart	20:40 Tues., Thurs., Sun.
Pretoria	Arrive	04:50 next morning
Johannesburg	Arrive	06:16 next morning

Fares

- Johannesburg to Komatipoort costs R170 (about £14 or US$21)
- Ressano Garcia to Maputo costs 15MT (about 30p or less than $1)

SOUTH AFRICA

Find up-to-date information about fares and schedules for South African buses and trains on the internet or at your local bus and train stations. This map shows main South African bus and train routes that connect with other countries in southern Africa.



Average cost of student hostel accommodation

Country	Cost of accommodation per night
Botswana	234,56 Botswana pula
Kenya	1 010,40 Kenyan shillings
Mozambique	976,50 Mozambique metical
Malawi	4 147,55 Malawian kwacha
Namibia	85,00 Namibian dollars
Tanzania	63 121,92 Tanzanian shillings
Uganda	34 790,00 Ugandan shillings
Zambia	88 380,00 Zambian kwacha
Zimbabwe	6 514,20 Zimbabwe dollars

Exchange rates

Country	Currency	One rand buys
Botswana	Pula	0,938
Kenya	Shilling	10,267
Mozambique	Metical	3,411
Malawi	Kwacha	32,942
Namibia	Dollar	1,000
Tanzania	Shilling	188,265
Uganda	Shilling	297,625
United Kingdom	Pound	0,077
USA	Dollar	0,119
Zambia	Kwacha	591,528
Zimbabwe	Dollar	43,180

B Additional activities: solutions

Most investigations and assignments depend on the topics learners choose and on local conditions. Learners should discuss their findings – if possible, in class discussions. Assignments and investigations included in this Teacher's Guide are listed below. Solutions are given for certain assignments and investigations.

Term 1

Measurement

Investigations 1 to 3

Finance

Investigations 1 to 6
Assignment 1

Term 2

Measurement

Assignments 1 to 5
Investigations 1, 3, 5

Measurement: Investigation 2

Growth patterns in children aged 2 to 20

Teacher's Guide page 214

1. The data for the boys and girls has been plotted on the graphs on the next two pages.

2. Valid comments on the data:

- The sample groups of boys all have mean weights slightly above the median (the 50th percentile). As the group ages rise from 12 to 17, their mean weights come closer to the median. This indicates that the sample groups of boys tend towards a more normal weight for their age, as they get older.
- The sample groups of boys all have mean heights between the 50th and 75th percentiles – this indicates that they are all slightly taller than the median height for their age groups.
- The sample groups of girls all have mean weights slightly between the 50th and 75th percentiles – their weights are above the median for their age. As they get older, their mean weights came closer to the median – this indicates that they are becoming less overweight as they grow up.
- The sample groups of girls all have mean heights slightly above the median (the 50th percentile), and as they get older their heights come closer to the median. This suggests that some girls go through a phase of growing faster than normal when they are about 12 or 13 years old, but their heights tend to become more normal as they get into their late teens.

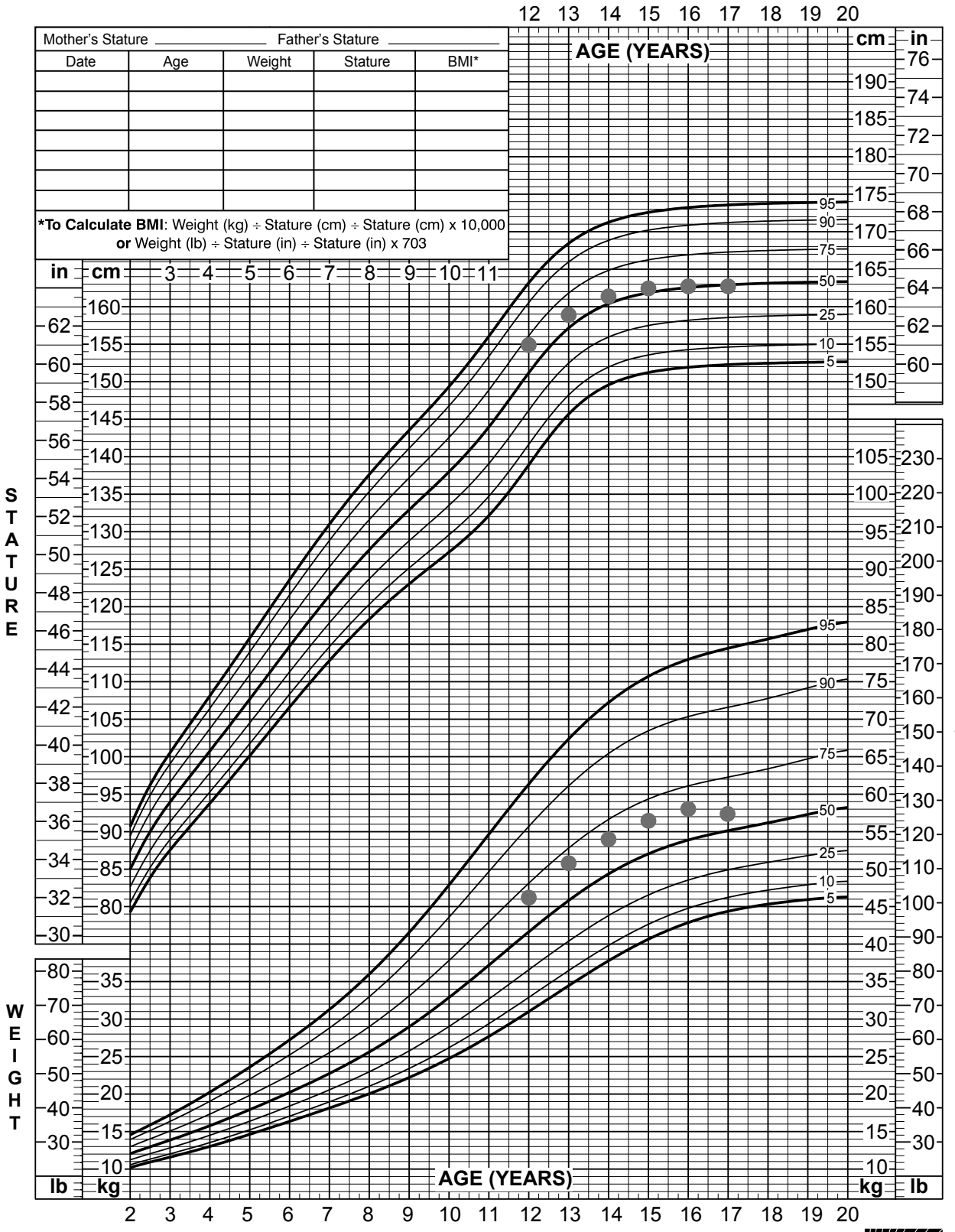
3–5. Answers will vary depending on the data collected from samples by the learners.

Plotted data for girls

2 to 20 years: Girls
Stature-for-age and Weight-for-age percentiles

NAME _____

RECORD # _____



Published May 30, 2000 (modified 11/21/00).

SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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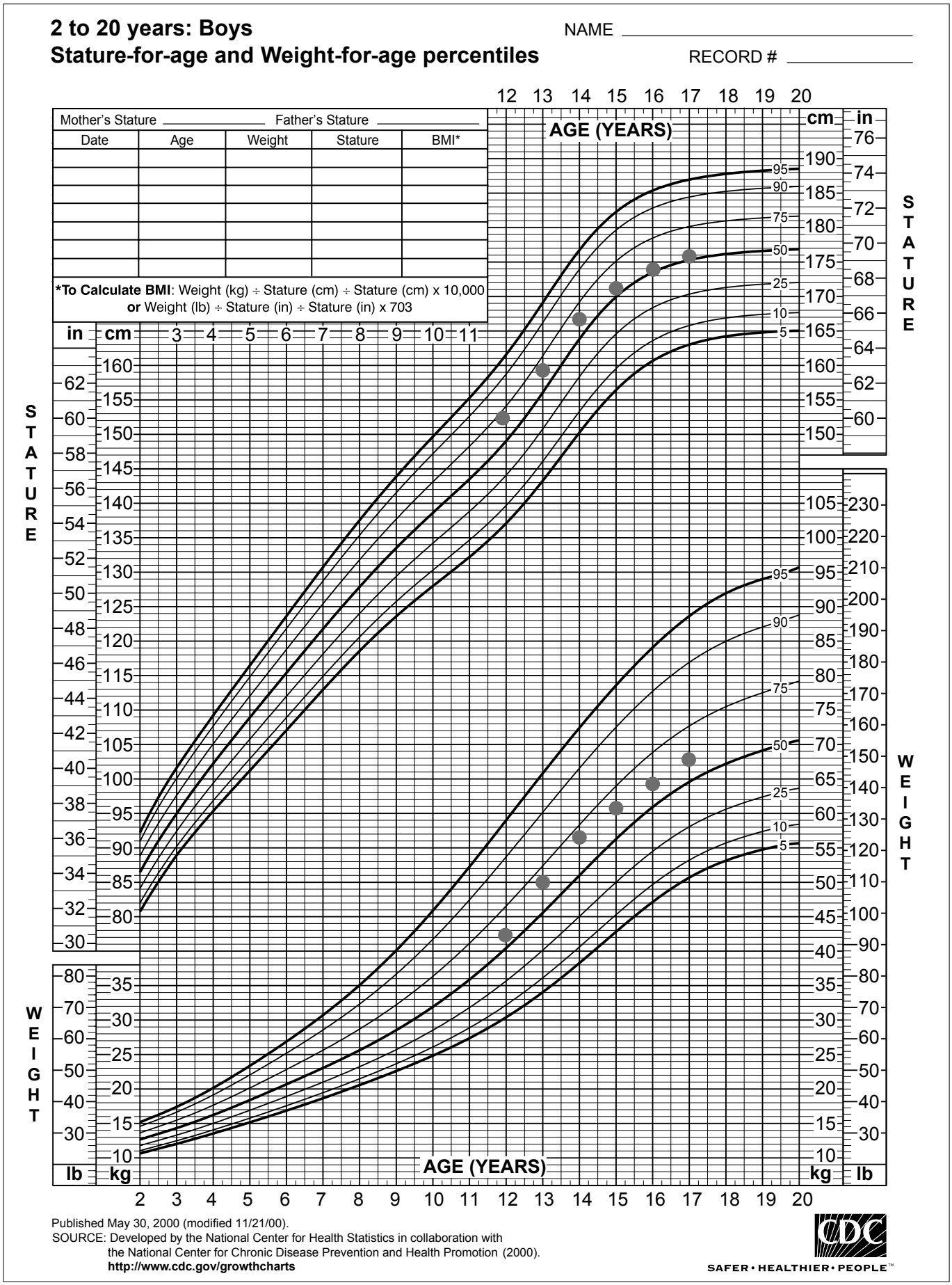
Plotted data for boys



Published May 30, 2000 (modified 11/21/00).
SOURCE: Developed by the National Center for Health Statistics in collaboration with the National Center for Chronic Disease Prevention and Health Promotion (2000).
http://www.cdc.gov/growthcharts

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Measurement: Investigation 4

What is the replacement cost of your home?

Teacher's Guide page 220

This is a challenging investigation, and you may want to choose only part of it for learners to focus on. Learners may also have difficulty getting access to information about the current replacement values stated in the insurance policy for their home, or they may live in informal dwellings where there is no such insurance. If possible, ask an insurance company assessor to visit the class and talk to them about how insurers calculate these replacement costs. He or she could then also comment briefly on whether learners' calculations seem realistic.

Finance

Assignments 2 to 6
Investigations 7 to 10

Term 3

Finance: Assignment 7

Calculate personal income tax for an employee

Teacher's Guide page 223

Assignments will differ.

Note: The difference between the figures on the payslip on page 391 in the Learner's Book for UIF and for PAYE and those given below may be due to thresholds for UIF and for calculating tax.

1. a.

Gross salary	R27 785,00
Plus use of motor vehicles	R660,00
Gross income	R28 445,00
Less non-taxable deductions	
Pension:	R2 083,88
UIF contribution:	R277,85
PAYE tax:	R 4 898,00
(based on R28 445,00 – R2083,88 – 277,85 = taxable income of 26 083,27)	
Total deductions	R7 259,73
Net pay	R20 525,27

(R27 785,00 – total deductions of R7 259,73 = R20 525,27)

b.

Gross income		
Annual salary (R27 785 x 12 months)	R 333 420,00	
Use of motor vehicle (R660 x 12 months)	R 7 920,00	
Total gross income		R 341 340,00
Pension (R2 083,88 x 12 months)	R 25 006,56	
UIF (1% of annual salary)	R 3 334,20	
Less total non-taxable deductions		(R28 340,76)
Taxable income		R312 999,24
Tax payable according to tax tables (R51 300 + 30% x (R312 999,24 – R250 000,00)		R70 199,77
Less primary tax rebate		(R11 440,00)
Tax payable		R58 759,77

R58 759,77 divided by 12 months = R4 896,65

2.

Gross salary	R29 452,00
Plus use of motor vehicles	R660,00
Gross income	R30 112,00
Less non-taxable deductions	
Pension:	R2 083,88
UIF contribution:	R294,52
PAYE tax*	R5 403,00
Total deductions	R7 781,40
Net pay	R21 670,60

(R29 452,00 – total deductions of R7 781,40 = R21 670,60)
Based on a gross salary of R30 112,00 – R2083,88 – R294,52 = taxable income of R27 733,60

3. Answers will differ because the monthly tax tables give a single amount for a monthly tax deduction for a range of incomes while the annual amount uses a formula to calculate the tax amount.

Finance

Assignment 8

The 1 times table

$1 \times 1 = 1$
$2 \times 1 = 2$
$3 \times 1 = 3$
$4 \times 1 = 4$
$5 \times 1 = 5$
$6 \times 1 = 6$
$7 \times 1 = 7$
$8 \times 1 = 8$
$9 \times 1 = 9$
$10 \times 1 = 10$
$11 \times 1 = 11$
$12 \times 1 = 12$

The 2 times table

$1 \times 2 = 2$
$2 \times 2 = 4$
$3 \times 2 = 6$
$4 \times 2 = 8$
$5 \times 2 = 10$
$6 \times 2 = 12$
$7 \times 2 = 14$
$8 \times 2 = 16$
$9 \times 2 = 18$
$10 \times 2 = 20$
$11 \times 2 = 22$
$12 \times 2 = 24$

The 3 times table

$1 \times 3 = 3$
$2 \times 3 = 6$
$3 \times 3 = 9$
$4 \times 3 = 12$
$5 \times 3 = 15$
$6 \times 3 = 18$
$7 \times 3 = 21$
$8 \times 3 = 24$
$9 \times 3 = 27$
$10 \times 3 = 30$
$11 \times 3 = 33$
$12 \times 3 = 36$

The 4 times table

$1 \times 4 = 4$
$2 \times 4 = 8$
$3 \times 4 = 12$
$4 \times 4 = 16$
$5 \times 4 = 20$
$6 \times 4 = 24$
$7 \times 4 = 28$
$8 \times 4 = 32$
$9 \times 4 = 36$
$10 \times 4 = 40$
$11 \times 4 = 44$
$12 \times 4 = 48$

The 5 times table

$1 \times 5 = 5$
$2 \times 5 = 10$
$3 \times 5 = 15$
$4 \times 5 = 20$
$5 \times 5 = 25$
$6 \times 5 = 30$
$7 \times 5 = 35$
$8 \times 5 = 40$
$9 \times 5 = 45$
$10 \times 5 = 50$
$11 \times 5 = 55$
$12 \times 5 = 60$

The 6 times table

$1 \times 6 = 6$
$2 \times 6 = 12$
$3 \times 6 = 18$
$4 \times 6 = 24$
$5 \times 6 = 30$
$6 \times 6 = 36$
$7 \times 6 = 42$
$8 \times 6 = 48$
$9 \times 6 = 54$
$10 \times 6 = 60$
$11 \times 6 = 66$
$12 \times 6 = 72$

The 7 times table

$1 \times 7 = 7$
$2 \times 7 = 14$
$3 \times 7 = 21$
$4 \times 7 = 28$
$5 \times 7 = 35$
$6 \times 7 = 42$
$7 \times 7 = 49$
$8 \times 7 = 56$
$9 \times 7 = 63$
$10 \times 7 = 70$
$11 \times 7 = 77$
$12 \times 7 = 84$

The 8 times table

$1 \times 8 = 8$
$2 \times 8 = 16$
$3 \times 8 = 24$
$4 \times 8 = 32$
$5 \times 8 = 40$
$6 \times 8 = 48$
$7 \times 8 = 56$
$8 \times 8 = 64$
$9 \times 8 = 72$
$10 \times 8 = 80$
$11 \times 8 = 88$
$12 \times 8 = 96$

The 9 times table

$1 \times 9 = 9$
$2 \times 9 = 18$
$3 \times 9 = 27$
$4 \times 9 = 36$
$5 \times 9 = 45$
$6 \times 9 = 54$
$7 \times 9 = 63$
$8 \times 9 = 72$
$9 \times 9 = 81$
$10 \times 9 = 90$
$11 \times 9 = 99$
$12 \times 9 = 108$

The 10 times table

$1 \times 10 = 10$
$2 \times 10 = 20$
$3 \times 10 = 30$
$4 \times 10 = 40$
$5 \times 10 = 50$
$6 \times 10 = 60$
$7 \times 10 = 70$
$8 \times 10 = 80$
$9 \times 10 = 90$
$10 \times 10 = 100$
$11 \times 10 = 110$
$12 \times 10 = 120$

The 11 times table

$1 \times 11 = 11$
$2 \times 11 = 22$
$3 \times 11 = 33$
$4 \times 11 = 44$
$5 \times 11 = 55$
$6 \times 11 = 66$
$7 \times 11 = 77$
$8 \times 11 = 88$
$9 \times 11 = 99$
$10 \times 11 = 110$
$11 \times 11 = 121$
$12 \times 11 = 132$

The 12 times table

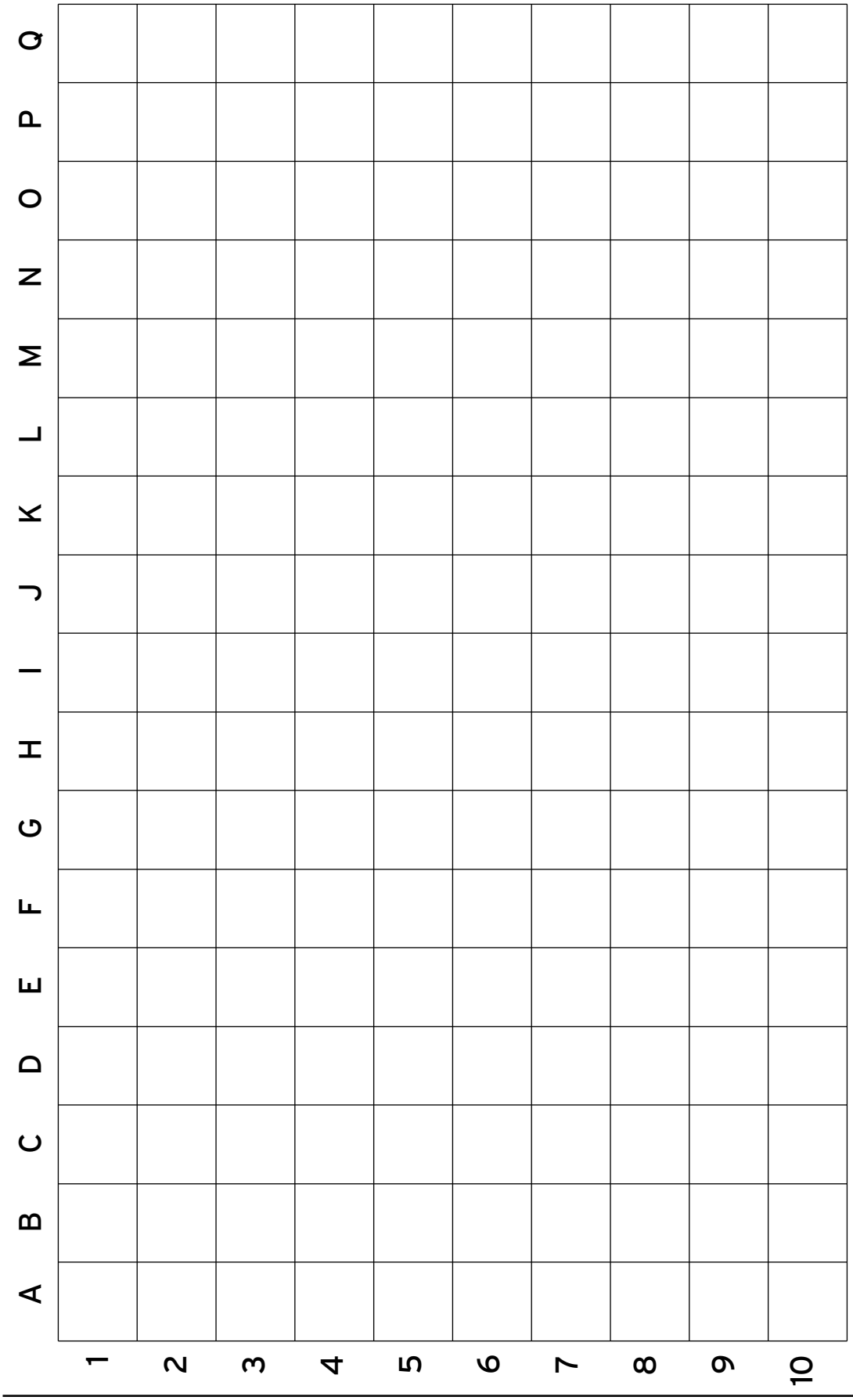
$1 \times 12 = 12$
$2 \times 12 = 24$
$3 \times 12 = 36$
$4 \times 12 = 48$
$5 \times 12 = 60$
$6 \times 12 = 72$
$7 \times 12 = 84$
$8 \times 12 = 96$
$9 \times 12 = 108$
$10 \times 12 = 120$
$11 \times 12 = 132$
$12 \times 12 = 144$

Times tables

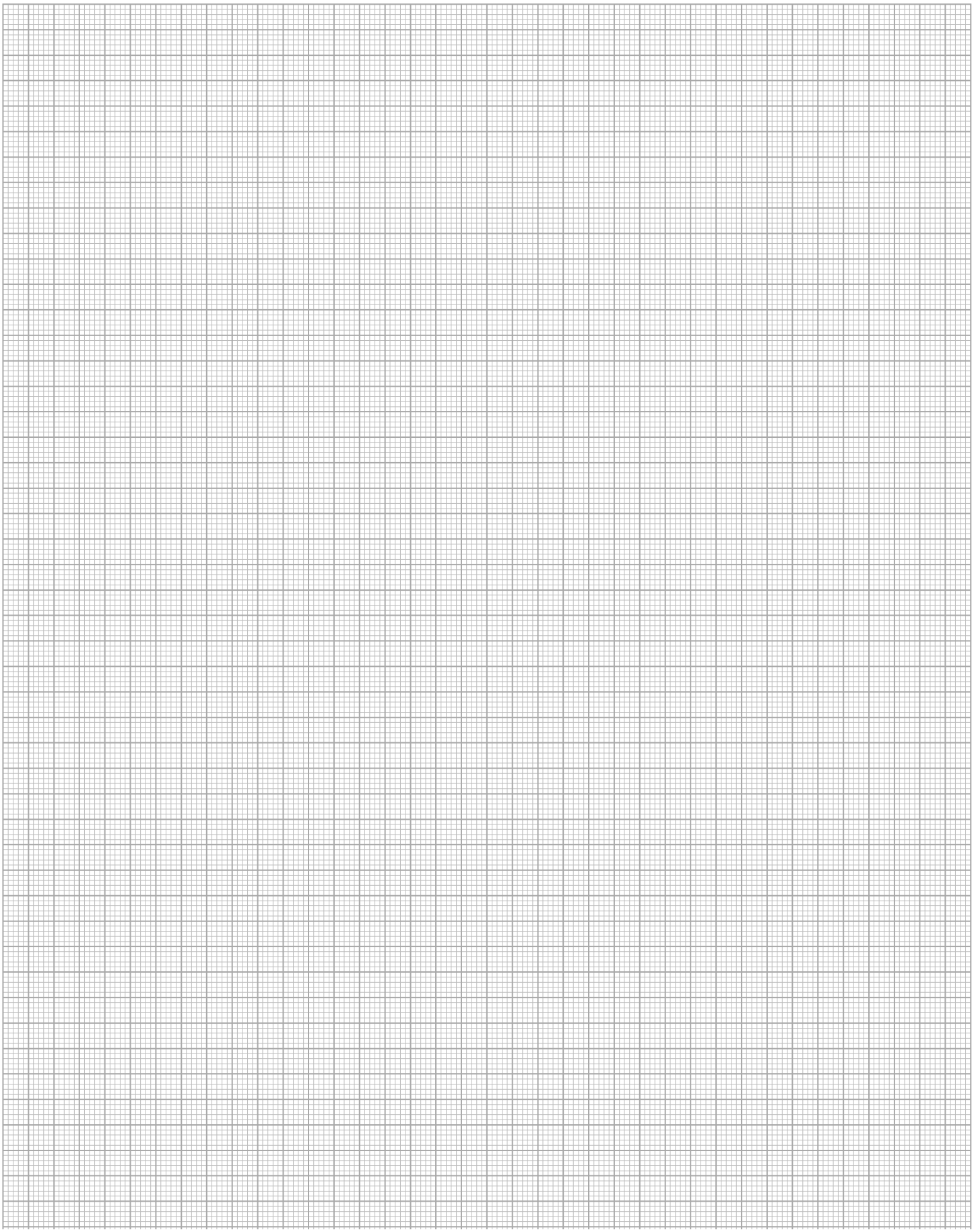
Quick reference chart

×	0	1	2	3	4	5	6	7	8	9	10	11	12
0	0	0	0	0	0	0	0	0	0	0	0	0	0
1	0	1	2	3	4	5	6	7	8	9	10	11	12
2	0	2	4	6	8	10	12	14	16	18	20	22	24
3	0	3	6	9	12	15	18	21	24	27	30	33	36
4	0	4	8	12	16	20	24	28	32	36	40	44	48
5	0	5	10	15	20	25	30	35	40	45	50	55	60
6	0	6	12	18	24	30	36	42	48	54	60	66	72
7	0	7	14	21	28	35	42	49	56	63	70	77	84
8	0	8	16	24	32	40	48	56	64	72	80	88	96
9	0	9	18	27	36	45	54	63	72	81	90	99	108
10	0	10	20	30	40	50	60	70	80	90	100	110	120
11	0	11	22	33	44	55	66	77	88	99	110	121	132
12	0	12	24	36	48	60	72	84	96	108	120	132	144

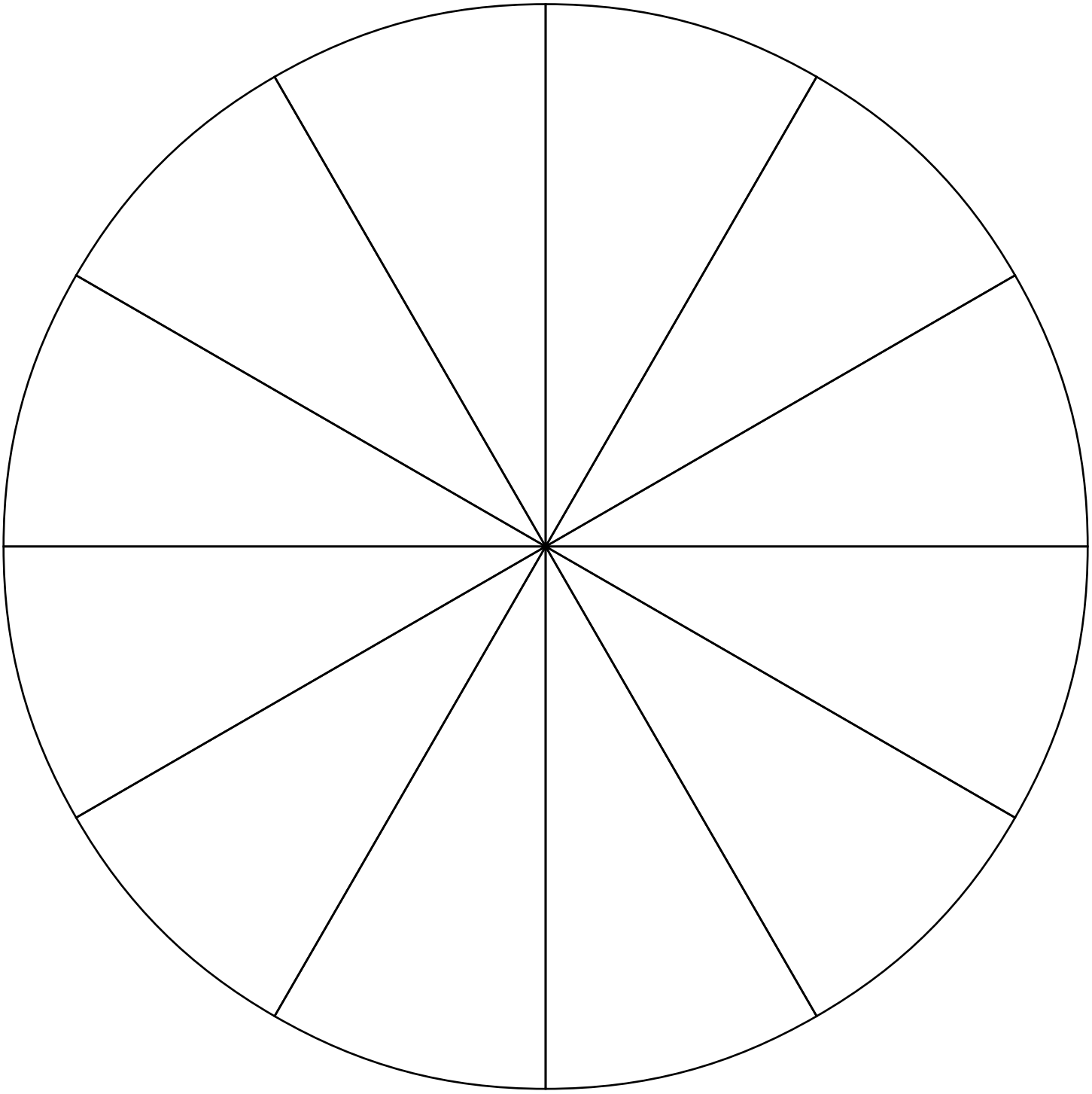
Alpha-numeric grid



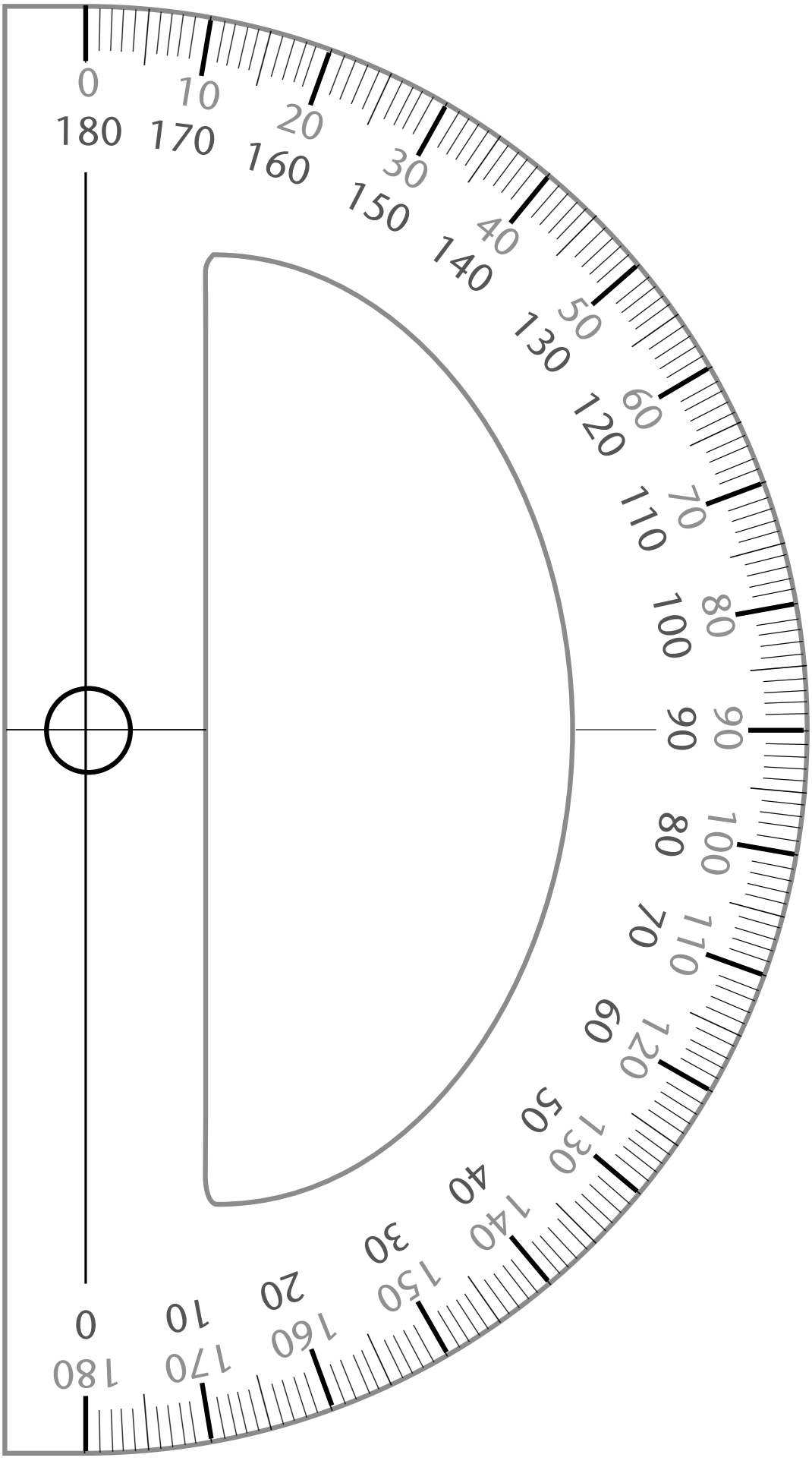
Graph paper



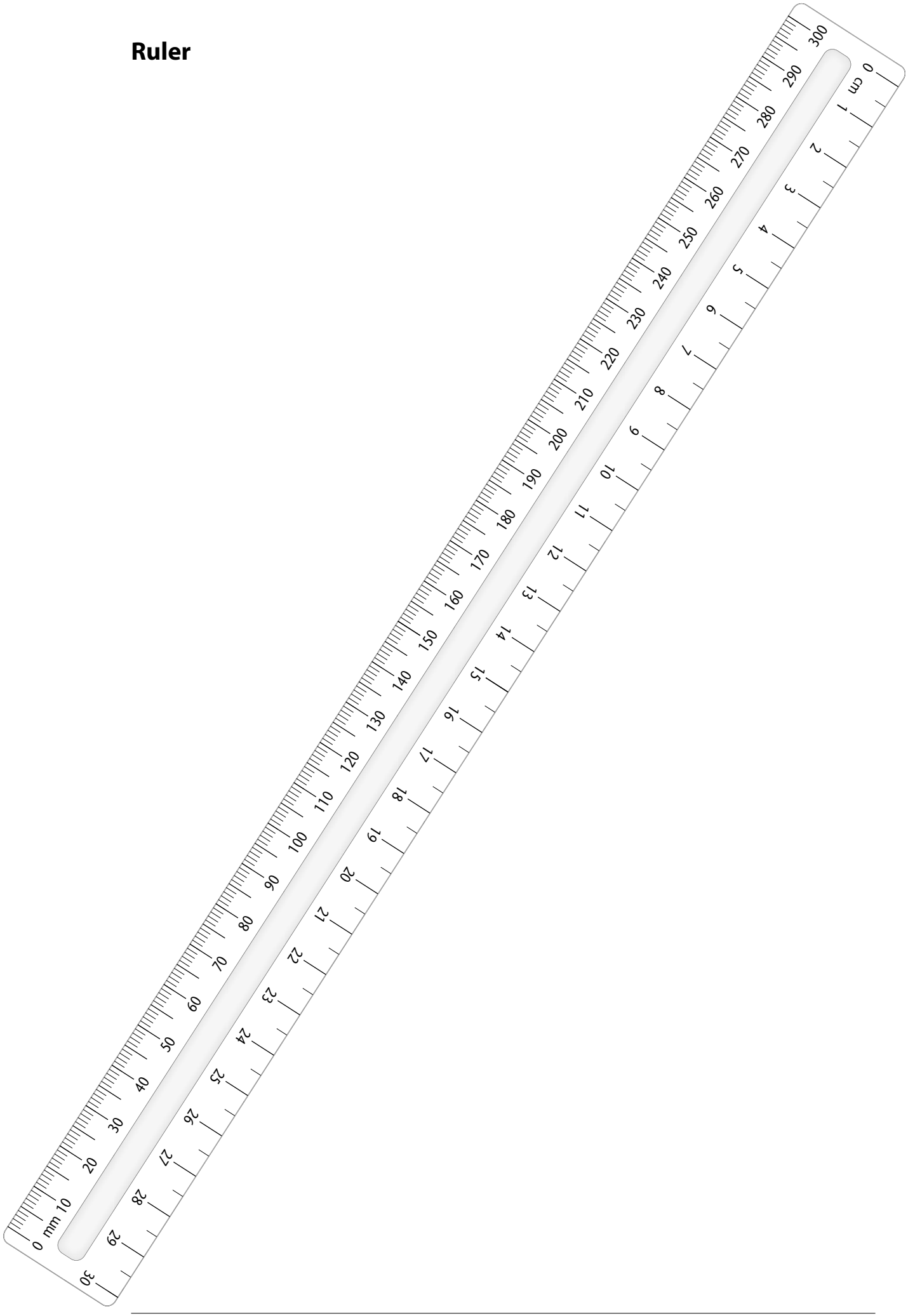
Pie chart



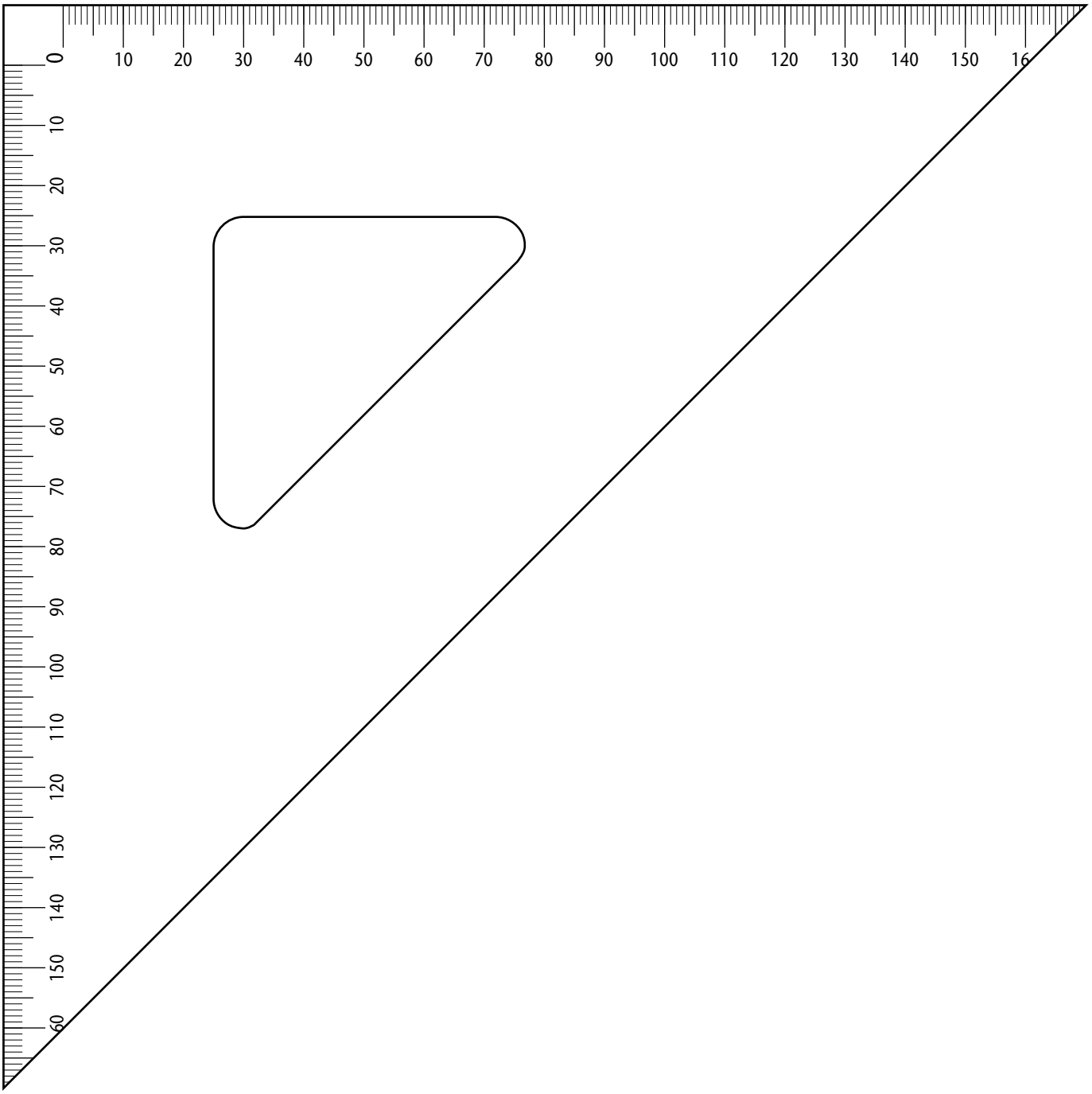
Protractor



Ruler


0 mm 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180 190 200 210 220 230 240 250 260 270 280 290 300
0 cm 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30

Set square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30
40
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130
140
150
60

SECTION 5

DOCUMENTS

Insert your own notes and documents, for example the CAPS document for Mathematical Literacy in this section.

Grade 12

Study & Master

Mathematical Literacy

Study & Master Mathematical Literacy Grade 12 **has been especially developed by an experienced author team according to the Curriculum and Assessment Policy Statement (CAPS). This new and easy-to-use course helps learners to master essential content and skills in Mathematical Literacy.**

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- **a reference section of the basic skills topics to revise the knowledge, skills and concepts in Mathematical Literacy**
- **margin notes to assist learners with new concepts**
- **ample examples with a strong visual input to connect Mathematical Literacy to everyday life**
- **a summary checklist and revision exercises at the end of each topic.**

The Teacher's Guide includes:

- **a weekly teaching schedule, divided into the four terms, to guide the teacher on what to teach**
- **solutions to all the activities in the Learner's Book.**

Karen Press acquired MPhil (cum laude) in Mathematics Education from UCT with a focus on Ethnomathematics, Language and Mathematics Education, and School Mathematics in Textbooks. She taught Mathematics, English and Accounting before becoming a publisher and professional materials developer. **Karen Morrison** (B. Prim Ed, B Ed, M Ed) is a teacher-trainer and has both local and international experience working with teachers and teaching organisations. She also authors mathematics books for Cambridge's CIE list.

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