

Study & Master

Mathematical Literacy

CAPS



Teacher's Guide

Karen Morrison • Karen Press

Grade

10

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Teacher's Guide**

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CONTENTS

Section 1	Introduction	5
Section 2	Planning	21
Section 3	Unit-by-unit Teaching tips and worked answers to activities	25
Section 4	Resources	115
	A. Projects	115
	B. Multiplication tables	125
	C. Transparencies	128
Section 5	Documents	135

SECTION 1

INTRODUCTION

Study and Master Mathematical Literacy Grade 10 is based on the Curriculum and Assessment Policy Statement (CAPS) issued by the Department of Basic Education in January 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 are stated in the CAPS as follows:

- a) The National Curriculum Statement Grades R–12 gives expression to what is 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 own lives. In this regard, the curriculum promotes the idea of grounding knowledge in local contexts, while being sensitive to global imperatives.
- b) The National Curriculum Statement Grades R–12 serves the purposes of:
 - equipping learners, irrespective of their socio-economic background, race, 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; and
 - providing employers with a sufficient profile of a learner’s competences.
- c) The National Curriculum Statement Grades R–12 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 sets high, achievable standards in all subjects;
 - progression; content and context of each grade shows progression from simple to complex;
 - human rights, inclusivity, environmental and social justice; infusing the principles and practices of social and environmental justice and human rights as defined in the Constitution of the Republic of South Africa.
- d) The National Curriculum Statement Grades 10–12 (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; and
 - credibility, quality and efficiency; providing an education that is comparable in quality, breadth and depth to those of other countries.
- e) The National Curriculum Statement Grades R–12 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; and
 - 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 as follows:

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 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:

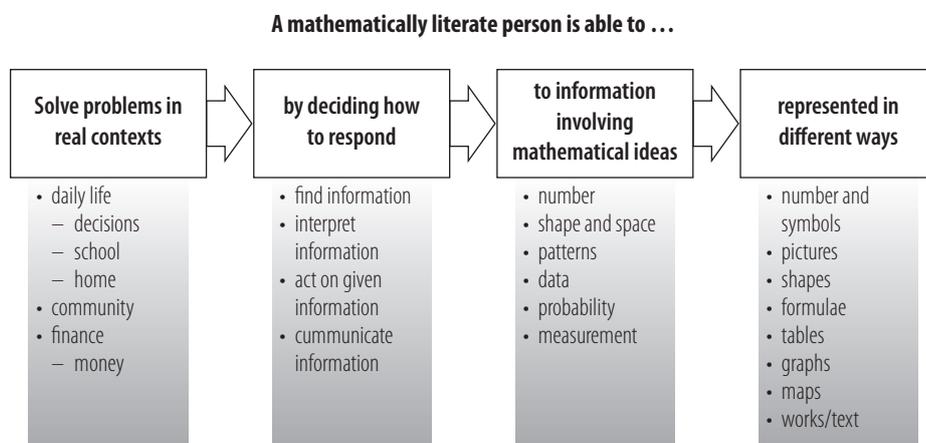
- a sense of self-worth and who are able to control aspects of their life related to mathematical understanding
- the skills and understanding to play a responsible role in our society
- the ability to calculate, estimate and use measuring instruments
- developed strategies and decision-making skills 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 to 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 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 which requires specific language, skills and methods to deal with subject-specific problems.

Mathematical Literacy takes mathematically 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 own lives, such as choosing a cellphone contract, they are mathematically literate. The table shows some 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
<i>Task and context</i>	<i>Content</i>
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 represents 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 the patient) Ratio and calculation
Mixing plaster (for building)	Ratio and proportion Measure 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 actively engage 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 practises, including unethical loans, unfair interest rates and HP terms that include large ‘balloon’ payments
- changes in personal finances, including rising household debts
- changes in demographics (more poorer households who may not use formal banking systems and so on)
- 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 changes which 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 own lives.

Here is a summary of the steps in this process and how these 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 learned (for example naming fractions of whole, adding simple fractions).
- Step 3: Using and applying learning in everyday contexts (for example, dividing pizza 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 learned (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 which allows teachers to:

- help learners see how mathematics can be valuable and useful in their own 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 deal with the mathematical contexts they have to manage in their own lives
- ensure 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 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 to grow their ability to make sense of mathematical ideas presented to them in various formats and ways.

Interpreting and communicating answers and calculations

Study and 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 own life experiences and ideas by applying skills in different contexts, integrating what they have learned in one context with what they are doing in others (margin notes)
- 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 representation 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 book. Learners are expected to estimate before they try to find solutions and to check their solutions against their estimates to make sure they are sensible and correct. Strategies for doing this are taught in the Basic Skills Topics in Term 1 and then used and reinforced as learners work through the Application Topics in Terms 1 to 4.

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 talking with others in pairs, groups and class discussions, learners will find that the ways in which they communicated their workings and solutions are not always clear to others and vice versa. Discussions with others and seeing and discussing modelled solutions in their books (and in this Teacher’s File) will help them to 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 in turn help them to better understand solutions and ideas presented to them by others.

In addition, this course aims to point out very clearly to learners that there are several ways to approach mathematical problems and to encourage them to be creative when they are doing and using mathematics.

Your role as the teacher

Effective teaching of Mathematical Literacy 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
- communication and representation of ideas
- identifying relevance and making connections.

Teaching Mathematical Literacy effectively means that you cannot just use the textbook and get 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 own lives and because they are not encouraged to connect what they are learning about mathematics to the experiences, skills and knowledge that they already have. 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.

In Grade 10, the focus is on personal and community contexts. Here are some examples of contexts that can be used as a starting point for investigating the maths skills necessary to do each thing:

- Make long-distance calls on your phone
- Read and compare prices in advertisements
- Calculate the time it takes to make a trip
- Set the timer on the stove, microwave or DVD
- Follow the directions for dosage on a prescription
- Follow a recipe
- Read a thermometer
- Read a map
- Measure your height and mass and compare it with others
- Calculate a sale price
- Play a board game
- Follow a knitting pattern
- Read a 24-hour clock or timetable
- Read your child's report card
- Read the gauges on the dashboard of a car
- Get information from the internet
- Use a calculator
- Use a computer
- Follow directions on a flow chart
- Take a bus, calculate fares
- Create a tournament schedule for school sports teams
- Rent a community hall for a school dance
- Keep score for a team
- Give someone directions to a specific location
- Calculate a tip for a server
- Order take-aways from a menu
- Make change, count money

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

Overcoming 'maths anxiety'

Many of the learners who have 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 carry out tasks in everyday life that require them to apply mathematical thinking quite easily. Using context rather than content is one of the first steps to helping learners a chance to 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 some things that you can say and some 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 they might be asking about something you are not sure of.
- Make sure you understand the concept you are working on before you move on.
- Refer back to the basic skills sections 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 which can detract from the real point of the 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 the use of real tools and apparatus can help learners to 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 10 as in the lower levels.

Navigating the textbook

We have divided the content of the course into **Basic Skills Topics** and **Application Topics**.

Basic Skills Topics

Learners need to revise the basic skills (as outlined in the CAPS document) at the beginning of Grade 10. Some learners will not know, or not have mastered the mathematical skills they need to deal with the problems they encounter in the course. It makes sense to provide a separate section which not only teaches these skills, but also shows how and where they will be used so that learners can work through them, but also refer back to them as needed.

The Basic Skills Topics are identified and taught and related to meaningful contexts. In addition, the relevance of the skills to real life is explained in learner-friendly ways.

This example from the book shows how this is done.

Learners need to know the rules of order of operations, particularly if they are using simple calculators. So, BODMAS and how it works is taught on pages 24–27.

First learners are given examples and asked which is correct.

Examples

1. Calculate $2 + 7 \times 2$.

Solution

If you do the addition part first:

$$\begin{aligned} 2 + 7 \times 2 &= 9 \times 2 \\ &= 18 \end{aligned}$$

If you do the multiplication part first:

$$\begin{aligned} 2 + 7 \times 2 &= 2 + 14 \\ &= 16 \end{aligned}$$

Which is correct? According to the rules of mathematics the *second* one is correct.

2. Calculate $12 \div 4 - 2$.

Solution

If you do the division part first:

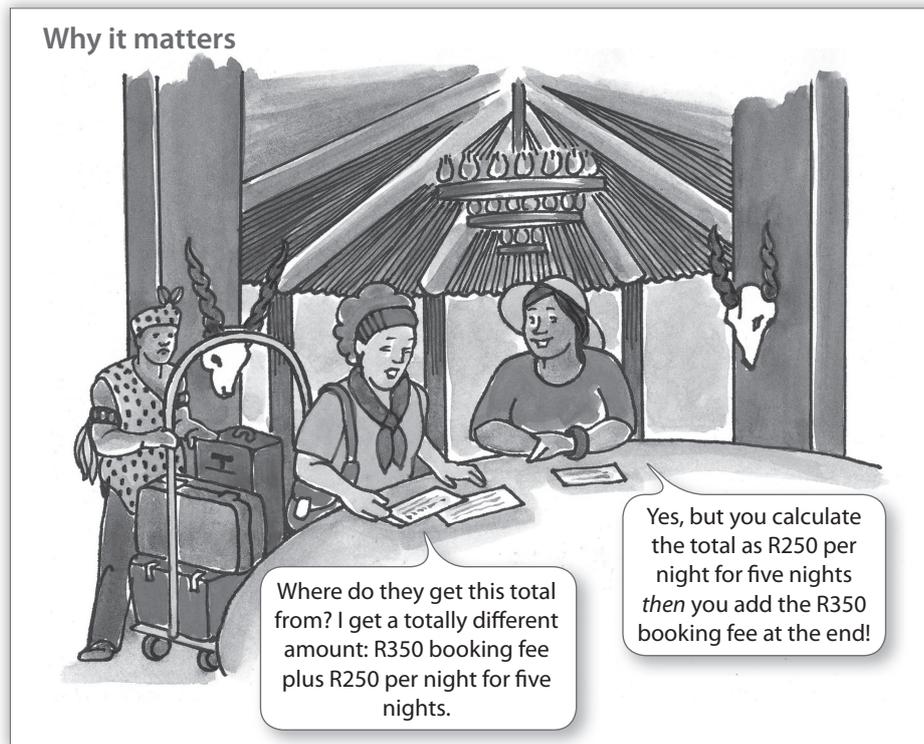
$$\begin{aligned} 12 \div 4 - 2 &= 3 - 2 \\ &= 1 \end{aligned}$$

If you do the subtraction part first:

$$\begin{aligned} 12 \div 4 - 2 &= 12 \div 2 \\ &= 6 \end{aligned}$$

Which is correct? According to the rules of mathematics the *first* one is correct.

Then they are told why its important to know the answer.



Next they are taught the rules.

BODMAS

Mathematics has rules to make sure that we always use the same order of operations when doing a calculation with many parts. The rules are summarised in the acronym BODMAS.

- B** first do the part(s) of the calculation in **brackets**
- O** if the calculation includes the word '**of**' (e.g. 'find half of 25') do this part next
- D** then do the **division**
- M** and the **multiplication** parts } work from left to right
- A** then do the **addition**
- S** and the **subtraction** parts } work from left to right

Examples

1. $88 + 22 \div 11 = 88 + 2$
 $= 90$
2. $(88 + 22) \div 11 = 110 \div 11$
 $= 10$
3. $(4 \times 2,6 - 5) \times (24 + 30 \div 5) = (10,4 - 5) \times (24 + 6)$
 $= 5,4 \times 30$
 $= 162$

Then they are given the chance to practise the skill and to apply it in different contexts.

4.1 Practise using BODMAS and other calculation rules

- Find the answer to each calculation. (Try to do them in your head.)
 - $36 - 8 + (5 \times 2)$
 - $(36 - 8 + 5) \times 2$
 - $(63 - 7) \times (2 + 7)$
 - $63 \times (7 \times 2) + 7$
 - $(4 + 3) \times 2 + (5 + 4) \times 4$
 - $4 + 3 \times 2 + 5 + 4 \times 4$
 - $(7 + 7) \div 7 + (8 - 6) \div 2$
 - $7 + 7 \div 7 + 8 - 6 \div 2$
- Use the rules for multiplying and dividing by 10, 100, 1 000, etc. to do these in your head.
 - $2,72 \times 10$
 - $2,72 \times 100$
 - $2,72 \div 10$
 - $2,72 \div 1\,000$
 - $8,2 \times 100$
 - $17,21 \times 10$
 - $3,295 \times 1\,000$
 - $7,01 \div 100$
 - $12 \div 0,2$
 - $18,66 \div 0,03$
 - $200 \div 0,05$
 - $0,2 \div 5$
- Write out the following information in number sentences. Then use BODMAS and any other calculation rules you need to find the total value of the calculation. (You will need to make some choices about which things to buy before you write out the final calculation.)

Application Topics

Once learners have worked through the Basic Skills Topics, they then apply these skills in a range of different contexts (as suggested in the CAPS document).

The Application Topics use real life South African as well as international examples as far as possible to try and provide appealing and interesting contexts that will interest and engage Grade 10 learners.

These examples from the book show how information is presented in different forms and gives you some indication of the variety of contexts.

Information in table form

Context: local train timetables (KZN)

MONDAYS TO FRIDAYS			BEREA ROAD – STANGER (kwaDUKUZA)											
Distance km	STATIONS	Usual Platform	0205	0207	0209	0213	9175 U	0219 C	0223	0231	0239 I	0245	0249	
-	BEREA ROAD	7				05:19	05:35	05:51	06:23	07:12	08:35	09:50	11:39	
2	DURBAN	7	03:41	04:19	05:23	05:39	05:55	06:27	07:16	08:39	09:54	11:43		
5	UMGENI	2	03:48	04:26	05:30	05:46	06:02	06:34	07:23	08:46	10:01	11:50		
8	BRIARDENE	-				05:52	06:40	07:29	08:52	10:07	11:56			
10	GREENWOOD PARK	1				05:57	06:43	07:36	08:55	10:10	11:59			
11	RED HILL	-				06:00	06:46	07:39	08:58	10:13	12:02			
13	AVOCA	-				06:06	06:52	07:45	09:04	10:19	12:08			
8	TEMPLE	2	03:53	04:31	05:35		06:07							
9	KENVILLE	2	03:56	04:34	05:38		06:10							
12	EFFINGHAM	2	04:00	04:38	05:42		06:14							
16	DUFF'S ROAD	3	04:06	04:44	05:48	06:12	06:20	06:59	07:52	09:10	10:26	12:15		
19	PHEONIX	2	04:11	04:49	05:53		06:25	07:04	07:57	09:15	10:31	12:20		
22	MOUNT EDGECOMBE	2	04:16	04:54	05:58		06:30	07:09	08:02	09:20	10:36	12:25		
26	OTTAWA	2	04:21	04:59	06:03		06:35	07:14	08:07	09:25	10:41	12:30		
29	VERULAM	2	04:26	05:04	06:08		06:40	07:19	08:12	09:30	10:45	12:34		
32	CANELANDS	1	04:30	05:08	06:12		06:44	07:23	08:16	09:34	10:49	12:38		
36	NYANINGA	1		
38	FLAMINGO HEIGHTS	1	04:38	05:16	06:20		06:52	07:31	08:24	09:42	10:57	12:46		
41	TONGAAT CENTRAL	1	04:43	05:21	06:25		06:57	07:36	08:29	09:47	11:02	12:51		
43	TONGAAT	1	04:45	05:23	06:27		07:00	07:38	08:31	09:49	11:04	12:53		
48	FRASER	-	04:22	04:52	05:30	06:34		07:45	08:38	09:56	11:11	13:00		
52	COMPENSATION	-	04:28	04:58	05:36	06:40		07:51	08:44	10:02	11:17	13:06		
57	UMHLALI	1	04:35	05:05	05:43	06:47		07:58	08:51	10:09	11:24	13:13		
60	SHAKASKRAAL	1	04:39	05:09	05:47	06:51		08:02	08:55	10:13	11:28	13:17		
63	TINLEY MANOR	-	04:44	05:14	05:52	06:56		08:07	09:00	10:18	11:33	13:22		
67	GROUTVILLE	-	04:51	05:21	05:59	07:03		08:14	09:07	10:25	11:40	13:29		
69	CARLOTTEDALE	1	04:55	05:25	06:03	07:07		08:18	09:11	10:29	11:44	13:33		
73	GLEDHOW	-	05:00	05:30	06:08	07:12		08:23	09:16	10:34	11:49	13:38		
77	STANGER (kwaDUKUZA)	2	05:06	05:34	06:12	07:17		08:29	09:22	10:40	11:55	13:44		

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Information on documents

Context: telephone bill from Telkom

Page 5 of 6 40153/01
Telkom

Telephone detail

	Account no 720347870009	Invoice date 27 Oct 2010	
	Invoice no 010H00074508		

Rental				
Service/no	Description	Period	No	Cost
0215553456	DSL Fast Bundle	27 Oct 10 - 26 Nov 10		R133.33
0215553456	Your Telephone Line	27 Oct 10 - 26 Nov 10		R116.93
0215553456	Rental	27 Oct 10 - 26 Nov 10		R0.00
0215553456	Standard Call Answer	27 Oct 10 - 26 Nov 10		R8.64
0215553456	Telkom CLOSER Option 2	27 Oct 10 - 26 Nov 10		R23.55
TIN 1493810	TI-ALL Access 5GB	Nov 10		R130.70
Total (rental)				R413.15

Usage		
Call type	No of calls	Cost
Basic telephony services		
Calls from service no 0215553456		
Local	92	R134.79
Long distance	5	R3.14
International	3	R3.64
Special service/numbers	12	R15.33
Mobile	13	R30.52
Subtotal		R187.42
Total (usage)		R187.42

Information in formulae

Context: baking and conversion of temperature

Every household should have a temperature conversion table handy in the kitchen. To convert from one temperature scale to the other we use the following formulae.

$$^{\circ}\text{F} = (1,8 \times ^{\circ}\text{C}) + 32$$

$$^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1,8$$

That recipe is in degrees Fahrenheit. This oven uses degrees Celsius.

But I baked it at 250 degrees like the recipe said!

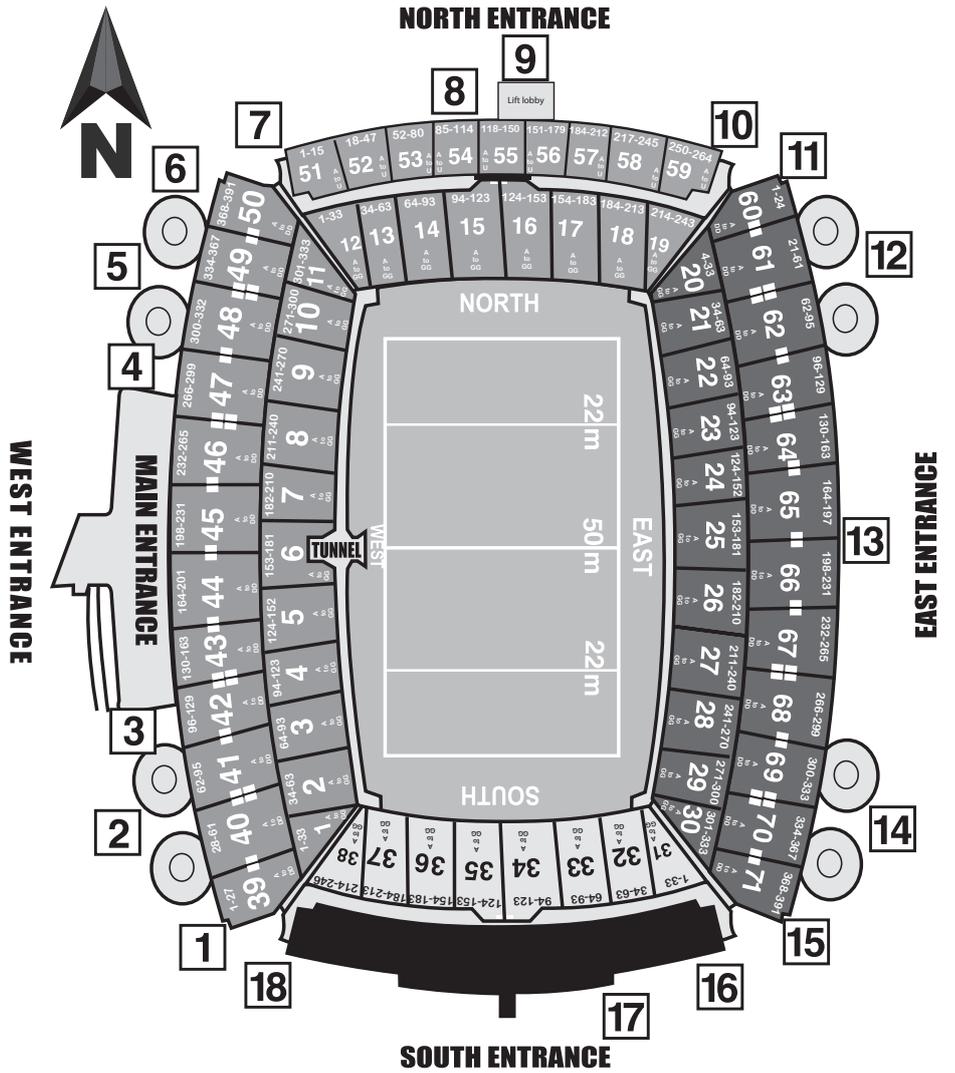
Information in pictures

Context: measuring map distances.

Estimate the distance. It is about 2,4 km.

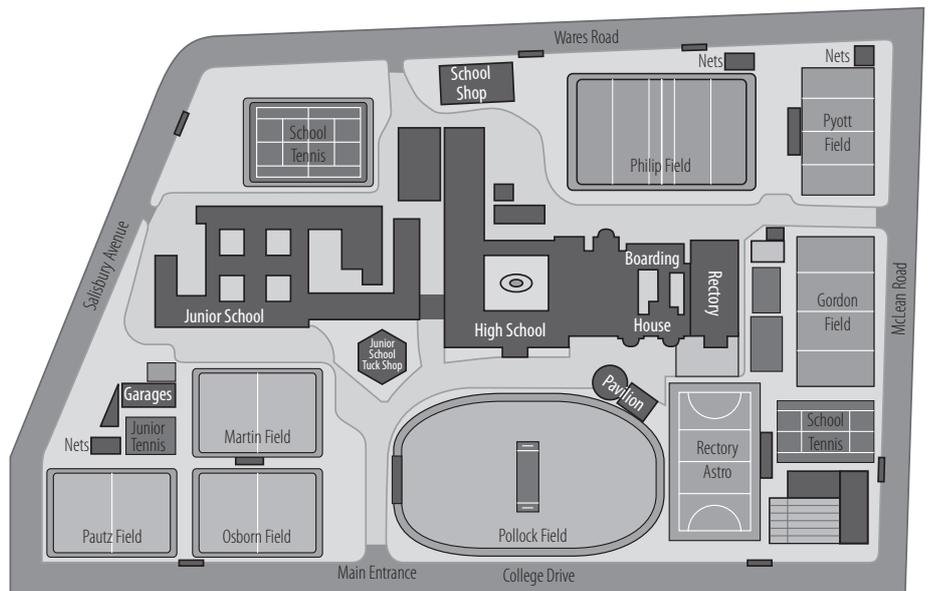
Information on plans

Context: South African sporting venues



Information on maps

Context: map of Grey High School grounds, Port Elizabeth



Information in writing

Context: using a cellphone

Example

These written instructions come from the user manual for a cellphone.

Keypad lock

To lock the keypad to prevent accidental keypresses, select Menu, and press * within 3.5 seconds.

To unlock the keypad, select Unlock, and press * within 1.5 seconds.

If requested, enter the lock code.

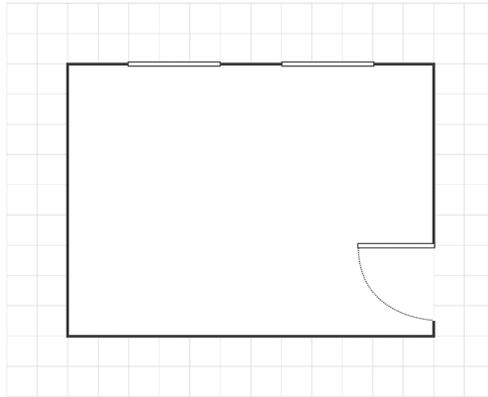
To answer a call when the keypad is locked, press the call key. When you end or reject the call, the keypad locks automatically.

Information on plans

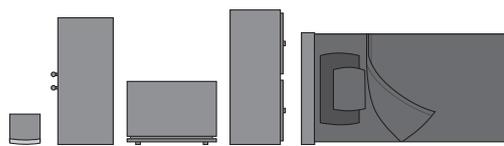
Context: furniture in a bedroom

Example

Amanda has a small bedroom. She has a bed, a set of drawers, a wardrobe, and a desk and chair in her room. She wants to move the room around, but the furniture is too heavy for her. So she draws a scaled plan of the room on squared paper.

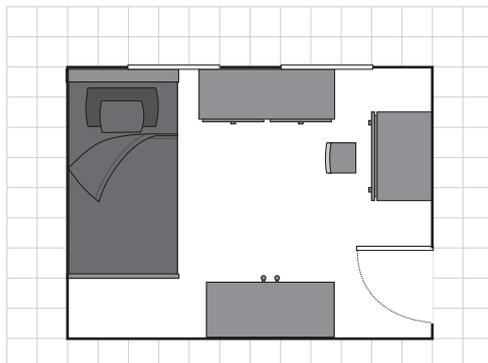


Amanda also draws and cuts out scaled versions of each piece of furniture.



Example continued

She then arranges the furniture on the plan to see how it will work. These are the two layouts she likes best.



Information in brochures and documents

Context: bank charges

3. Zwelihle received the table of bank charges for the new year from her bank. She has a current (cheque) account at the bank and every month she has more or less the same number of transactions.

These are:

- 2 cash withdrawals per week of R400 each
- 4 electronic account payments for the following amounts: R544,00; R75,00; R280,00; R650,00

Option 1: Pay as you transact

With this option you pay only for the transactions you make.

How to calculate your transaction fees:

Each transaction is charged a basic fee of R2,90 plus a further fee calculated on the value of the transaction. For example, cheques are charged at R2,90 plus 1,10% of the value, so if you issue a cheque for R600 the cost would be R2,90 plus R6,60 (1,10% of the cheque value). The total cheque fee will be R9,50.

Type of transaction	Base fee	Fee based on transaction value	Maximum total fee
Deposit (branch or ATM)			
Cheque deposits		Free	
Cash deposits ¹	R2,90	+ 0,90%	No maximum
Cash withdrawals			
Branch			
– using your bank card	R16,25 (min)	0,90%	No maximum
– using a cheque	cheque fee + R16,25 (min)	0,90%	No maximum
ATM ²	R2,90	+ 0,90%	No maximum
Payments			
Prepaid top-ups via Bank's channels		Free	
Electronic inter-account transfers	R2,90		
Electronic account payments	R2,90	+0,53%	R13,50
Cheque card purchases	R2,90	+0,53%	R13,50
Debit card purchases ³	R2,90	+0,53%	R13,50
Stop orders ⁴	R2,90	+0,53%	R13,50
Debit orders ⁵	R2,90	+1,00%	R26,00
Cheque transaction fee	R2,90	+1,10%	R26,00
Branch inter-account transfers and account payments	R2,90	+1,10%	R26,00

1 The first cash deposit per month is free, additional deposits will be charged irrespective of the value of the deposit.

2 Using another bank's ATM incurs an additional R6,70 inter-bank fee.

3 Debit card point-of-sale cash withdrawals incur the ATM cash withdrawal fee.

4 Stop orders in favour of The Bank's personal loan or student loan are only charged the base fee.

5 Debit orders in favour of another of your accounts, for example your home loan, are only charged the base fee.

There is a minimum monthly fee of R42, applied when your total monthly fees are less than R42.

Option 2: Fixed monthly fee

You get the following transaction for R99 a month:

Transactions exceeding the specified number are charged according to Option 1: Pay as you transact.

10 cheques	Unlimited electronic prepaid top-ups via Bank's channels
	Unlimited electronic balance enquiries
	ATM mini statements
8 ATM cash withdrawals	3 branch cash withdrawals
2 ATM cash deposits	Internet banking subscription fee included
20 electronic transactions ⁶	10 Cheque card purchases

6 Any combination of debit and stop orders, electronic inter-account transfers and electronic account payments.

Option 3: Refund⁷ (no interest is paid on credit balances)

Maintain a minimum monthly balance for a full month and we will refund certain service fees incurred under the 'Pay as you transact' option up to a maximum of:

Minimum positive balance	Maximum refund
R6 500 to R14 999	R75
R15 000 to R24 999	R110
R25 000 to R44 999	R180
R50 000 to R99 999	R230
R100 000+	R350

7 Refund is on ATM cash withdrawals, inter-account transfers, account payments, debit orders, cheque service fee, cheque card purchases and minimum monthly service fee.

Information

	Fee
Balance enquiries	
– at an ATM	R1,05
– at a branch	R2,65
– at another bank's ATM	R3,35
Internet banking statements	Free
ATM min statement	R1,05
Provisional statement:	
ATM – one free a month, thereafter	R2,65
Branch – one free a month, thereafter	R6,30
Transaction history:	
Two months back or part thereof	R6,30
Four months back or part thereof	R8,40
Six months back or part thereof	R10,50

Other services

	Fee
Declined ATM cash withdrawal	
– at an ATM	R2,00
– at another bank's ATM	R3,35
Monthly revolving credit plan administration fee	R10,50
Stop order establishment fee	R10,50
Chequebook	R15,75
Monthly ledger fee applied on overdrawn balances greater than R100 for five days or more a month	R19,50
Internet banking – monthly subscription	R21,00
First ATM card replacement	R21,00
Subsequent replacements	R21,00
Chequecard annual card fee (including lost card protection)	R50,00
Will safe custody annual fee	R60,00
Will drafting fee	R200,00–R350,00

Foreign exchange

	Fee
Prepaid forex payment and ATM card	
– card ⁸	R70,00
– commission ⁹	1,75%
Travellers cheques	1,40%
Foreign notes	1,60%

8 Valid for three years, subject to exchange control.

9 Fee calculated on the rand value of each transaction.

Details of minimum and maximum and other foreign exchange fees are available on request.

Cross referencing

As learners work through the course, they are directed to other places in the book by small boxes in the shoulder. These boxes do two things.

- They tell the learner where they will need to use the basic skills that they are learning. These boxes link forward to application topics.
- They tell the learners where to find the maths skill they need to apply to solve a problem. These boxes link backward to the basic skills topics and to places in the application topics where a particular skill was taught or used.



The methods for calculating percentages are explained in Term 1, Unit 2.

We have already referred to interest and interest rates several times in earlier sections. Interest is money that is paid as a ‘fee’ if you borrow money, or as a ‘reward’ if you keep money in a bank account. The amount of interest to be paid is calculated as a percentage of the borrowed money or the saved money. The exact percentage used to calculate interest is the **interest rate**.

	SECTION 2	
	PLANNING	

Year summary

Summary of the number of weeks spent on each topic		Number of weeks
Basic Skills Topics	Number and calculations with numbers	5–6 weeks
	Patterns, relationships and representations	3–4 weeks
	Finance	6–7 weeks
	Measurement	6–7 weeks
	Maps, plans and other representations of the physical world	5–6 weeks
	Data handling	4–5 weeks
	Probability	1–2 weeks

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.

- The topics *Numbers and calculations with numbers* and *Patterns, relationships and representations* have been included in this work schedule to provide teachers with the opportunity to revise the concepts contained in these topics. However, it is essential that these concepts are not taught in the absence of contexts and rather that learners are exposed to these concepts in realistic scenarios.
- Also note that the topic *Interpreting and communicating answers and calculations* does not appear in this work schedule. This is because it is expected that the skills outlined in this topic will be integrated and taught throughout all of the other topics.

Term 1			
Week	CAPS topic	Unit	Pages
1	Numbers and calculations with numbers	1 Number formats and conventions	2–10
		2 Estimate solutions to calculations	11–16
2	Numbers and calculations with numbers	3 Accurate calculations: add, subtract, multiply and divide	17–23
		4 Doing calculations in the right order	24–27
		5 Squares, cubes and square roots	28–30
		6 Calculations with fractions	31–36
3	Numbers and calculations with numbers	7 Using a calculator to add, subtract, multiply and divide	37–45
		8 Ratios	46–54

Week	CAPS topic	Unit	Pages
4	Numbers and calculations with numbers	9 Proportion	55–59
		10 Rates	60–74
5	Numbers and calculations with numbers	11 Percentages	75–88
6	Patterns, relationships and representations	12 Making sense of graphs that tell a story	89–97
7	Patterns, relationships and representations	13 Patterns and relationships	98–109
8	Patterns, relationships and representations	14 Representations of relationships in tables, equations and graphs	110–117
9	Measurement (Conversions and time)	15 Conversion of measuring units	118–124
		16 Measuring time	125–137
Assessment			
Assignment/Investigation			
Control test (covering Numbers and calculation with numbers; Patterns, relationships and representations; and Measurement)			
Term 2			
Week	CAPS topic	Unit	Pages
1	Finance (Financial documents and tariff systems)	1 Reading financial documents	140–149
2	Finance (Financial documents and tariff systems)	2 Reading shopping documents	150–158
		3 Comparing tariffs	159–168
3	Measurement (Measuring length, weight, volume, temperature)	4 Measuring length and distance	169–178
		5 Measuring mass	179–189
4	Measurement (Measuring length, weight, volume, temperature)	6 Measuring volume	190–196
		7 Measuring temperature	197–201
5	Maps, plans and other representations of the physical world (Scale and mapwork)	8 Working with maps	202–207
6	Maps, plans and other representations of the physical world (Scale and mapwork)	9 Making sense of maps	208–220
7	Probability	10 Expressions of probability	221–226
8	Probability	10 Expressions of probability	227–234
9	Revision/Examination		
Assessment			
Assignment/Investigation			
Mid-year examinations (2 papers; 1 hour each; 50 marks each) (covering Finance; Measurement; Maps; and Probability; integrated with Numbers and Patterns concepts)			

Term 3			
Week	CAPS topic	Unit	Pages
1	Finance (Income, expenditure, profit/loss, income and expenditure statements and budgets)	1 Income and expenditure statements	236–242
2	Finance (Income, expenditure, profit/loss, income and expenditure statements and budgets)	2 Preparing a budget	243–246
3	Finance (Income, expenditure, profit/loss, income and expenditure statements and budgets)	2 Preparing a budget	246–249
4	Measurement (Perimeter, area and volume)	3 Perimeter, area and volume	250–258
5	Measurement (Perimeter, area and volume)	3 Perimeter, area and volume	259–267
6	Measurement (Perimeter, area and volume)	3 Perimeter, area and volume	267–269
7	Maps, plans and other representations of the physical world (Models and plans)	4 Understanding instructions and assembly diagrams	270–278
8	Maps, plans and other representations of the physical world (Models and plans)	5 Floor plans	279–289
9	Maps, plans and other representations of the physical world (Models and plans)	6 Using models to investigate shape and space	290–292
Assessment Assignment/Investigation Control test (covering Finance; Measurement; and Maps and plans; integrated with Numbers and Patterns concepts)			

Term 4			
Week	CAPS topic	Unit	Pages
1	Finance (Interest, banking and taxation)	1 Interest and interest rates	294–299
2	Finance (Interest, banking and taxation)	2 Reading bank account statements	300–312
		3 Value-added tax (VAT)	313–318
3	Data handling	4 Collecting data	319–332
4	Data handling	5 Classifying and organising data	333–339
5	Data handling	6 Summarising data	340–351
6	Data handling	7 Representing data	352–359
7	Data handling	8 Interpreting and analysing data	360–369
8	Revision/Examination		
9	Revision/Examination		
Assessment Assignment/Investigation End of year examinations (2 papers; 1½ hours each; 75 marks each) (covering all the topics in the Grade 10 curriculum)			

	SECTION 3	
	UNIT-BY-UNIT	

	TERM 1	
	WORKED ANSWERS TO EXERCISES	

The basic skills topics covered in Term 1 are intended to highlight fundamental skills that learners need to have in order to be able to succeed at Mathematical Literacy. These are key topics in this course and should therefore be taught with extra care. Without these basic skills learners will not develop a solid foundation on which to build the rest of their FET mathematical literacy journey.

	Unit 1 Number formats and conventions <hr/> Learner's Book pages 2–10 Duration: 2 hours
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Teaching tips

- Be aware that although South Africa has a well-defined number format system, not everybody in the country uses it. The American system is frequently used when writing currency amounts, especially in newspapers and magazines.
- Another American convention that is increasingly used is the value of a billion. One billion is a million million (1 000 000 000 000), but the American billion, one thousand million (1 000 000 000), is often used in South Africa.
- Give learners lots of practice with saying and writing out numbers. You could prepare a worksheet or spot test to help you achieve this.
- Negative numbers are often misunderstood. Temperature is a good way of introducing negative numbers. Cut out weather maps from the daily newspaper to discuss in class.

Solutions

» 1.1 Practise using number conventions (1)

Learner's Book page 4

- twenty-three comma four zero
 - two thousand three hundred and forty-two
 - twenty-three thousand four hundred and twenty-one comma four
 - two hundred and thirty-four thousand two hundred and fourteen comma zero four

when tackling nearly any mathematics problem. Try to get the process to become routine for them by reminding them of it whenever possible.

- Estimation is a useful tool in predicting answers. It can be used to check the reasonableness of final answers or as a timesaving method to get rough answers.
- There are several ways of rounding off. Learners should know a variety of these and should be able to choose which is most useful in any given situation.
- Caution learners that rounding off can lead to large errors in some cases, so estimation should be used with care.

Solutions

» 2.1 Practise rounding off

Learner's Book page 14

- | | | | | | | | |
|-------|----|-------|---------|-------|------|---------|-------|
| 1. a. | 40 | b. | 70 | c. | 210 | | |
| | d. | 0,220 | e. | 3,6 | | | |
| 2. a. | i. | 900 | ii. | 1 200 | iii. | 454 880 | |
| | b. | i. | 337 800 | ii. | 800 | iii. | 100 |
| | c. | i. | 4,8 | ii. | 34,7 | iii. | 973,1 |

» 2.2 Practise the 'estimate-calculate-check' method

Learner's Book page 14

- $40c + 60c = 100c$ (97c)
 - $80c + 20c = 100c$ (95c)
 - $R3,80 + R5,40 = R9,20$ (R9,17)
 - $R4,90 + 40c = R5,30$ (R5,23)
- $R1,00 - 70c = 30c$ (35c)
 - $R5,00 - R1,50 = R3,50$ (R3,60)
 - $R4,00 - R3,00 = R1,00$ (R1,05)
 - $R10,00 - R8,00 = R2,00$ (R2,15)
 - $R50,00 - R12,00 = R38,00$ (R38,05)
 - $R100,00 - R53,00 = R47,00$ (R47,40)
- 12 sets ($11 \text{ sets} \times 3 = 33$; $12 \text{ sets} \times 3 = 36$)
 - Sold in sets of 4 – need 9 sets
Sold in sets of 6 – need 6 sets
 - 5 sets
 - $34 \times R52,00 = R1\ 768$
Need 12 sets $\therefore 12 \times R120,00 = R1\ 440,00$
Best to buy 12 sets of chairs
 - $34 \times R45,00 = R1\ 530,00$
Need 7 sets $\therefore 7 \times R200,00 = R1\ 400,00$
Best to buy 7 sets of sleeping mats

Unit 3

Accurate calculations: add, subtract, multiply and divide

Learner's Book pages 17–23

Duration: 1 hour

Teaching tips

- The processes of addition, subtraction, multiplication and division are obviously at the heart of being literate in mathematics. Most of the content in this unit will not be new to learners, but it serves as a good diagnostic tool to determine what level your learners are at.

- Particularly important is showing learners the different methods of carrying out each operation (for example adding by breaking up numbers, by using columns and by balancing). This should lead them to a better understanding of what each operation means.
- Long division, though time-consuming, is a section worth spending some time on. Each of the operations are tested in long division, so it is a useful way of practising all the skills from this unit.
- Spend some time on the final set of questions with number sentences. Many of the problems your learners will be presented with will be in the form of a description in words. Learners need practice in translating word problems into mathematical statements.

Solutions



3.1 Practise the estimate-calculate-check method

Learner's Book page 22

- $217 + 302 = (217 + 2) + (302 - 2) = 219 + 300 = 519$
 - $45 + 654 = (45 + 4) + (654 - 4) = 49 + 650 = 699$
 - $103 + 4\,289 = (103 - 3) + (4\,289 + 3) = 100 + 4\,292 = 4\,392$
 - $899 + 3\,204 = (899 + 1) + (3\,204 - 1) = 900 + 3\,203 = 4\,103$
- 85
 - 58
 - 17 457
 - 2 301
- $$\begin{array}{r} 5,6 \\ + 23,3 \\ \hline 28,9 \end{array}$$
 - $$\begin{array}{r} 60,71 \\ + 3,042 \\ \hline 63,752 \end{array}$$
 - $$\begin{array}{r} 1\,003,99 \\ + 3\,012,95 \\ \hline 4\,016,94 \end{array}$$
 - $$\begin{array}{r} 6,666 \\ + 900,99 \\ \hline 907,656 \end{array}$$
- $$\begin{array}{r} 21,9 \\ - 12,1 \\ \hline 9,8 \end{array}$$
 - $$\begin{array}{r} 304,46 \\ - 152,23 \\ \hline 152,23 \end{array}$$
 - $$\begin{array}{r} 904,08 \\ - 34,61 \\ \hline 869,47 \end{array}$$
 - $$\begin{array}{r} 44\,892,34 \\ 12\,731,02 \\ \hline 32\,161,32 \end{array}$$
- 760
 - 21 000
 - 95 000
 - 34 200
- $$46 \times 387 = (40 + 6) \times (300 + 80 + 7)$$

$40 + 6$	$300 \times 40 = 12\,000$
$\times 300 + 80 + 7$	$300 \times 6 = 1\,800$
	$80 \times 40 = 3\,200$
	$80 \times 6 = 480$
	$7 \times 40 = 280$
	$7 \times 6 = 42$
	$17\,802$
 - $$1\,087 \times 28 = 1\,087 \times 28 = (1\,000 + 80 + 7) \times (20 + 8)$$

$20 \times 1\,000 = 20\,000$
$20 \times 80 = 1\,600$
$20 \times 7 = 140$
$8 \times 1\,000 = 8\,000$
$8 \times 80 = 640$
$8 \times 7 = 56$
$30\,436$

$$\begin{array}{r}
 \text{c. } 134 \times 787 = (100 + 30 + 4) \times (700 + 80 + 7) \\
 \begin{array}{r}
 100 + 30 + 4 \quad 700 \times 100 = 70\,000 \\
 \times 700 + 80 + 7 \quad 700 \times 30 = 21\,000 \\
 \hline
 \quad \quad \quad 700 \times 4 = 2\,800 \\
 \quad \quad \quad 80 \times 100 = 8\,000 \\
 \quad \quad \quad 80 \times 30 = 2\,400 \\
 \quad \quad \quad 80 \times 4 = 320 \\
 \quad \quad \quad 7 \times 100 = 700 \\
 \quad \quad \quad 7 \times 30 = 210 \\
 \quad \quad \quad 7 \times 4 = 28 \\
 \hline
 \quad \quad \quad 105\,458
 \end{array}
 \end{array}$$

$$\text{d. } 1\,000 \times 1\,000 = 1\,000\,000$$

$$7. \text{ a. } 56 \div 4 = 14$$

$$\text{b. } 302 \div 4 = 75,5$$

$$\text{c. } 678 \div 16$$

$$\begin{array}{r}
 37 + 4 + 1 \\
 16 \overline{) 600 + 70 + 8} \\
 \underline{592} \\
 8 \\
 \underline{8} \\
 64 \\
 \underline{14} \\
 22 \\
 \underline{16} \\
 6
 \end{array}$$

$$16 \times 37 = 592$$

$$16 \times 4 = 64$$

$$\begin{array}{l}
 \text{So } 678 \div 16 = 37 + 4 + 1 \quad \text{remainder } 6 \\
 \phantom{\text{So }} = 42 \phantom{\text{ remainder }} 6
 \end{array}$$

$$\text{d. } 20\,000 \div 200 = 100$$

$$8. \text{ a. } 45,2 \times 21$$

$$= 45,2 \times (20 + 1)$$

$$45,2 \times 20 = 904$$

$$45,2 \times 1 = \underline{45,2}$$

$$\underline{949,2}$$

$$\text{b. } 0,3 \times 0,03 = 0,009$$

$$\text{c. } \frac{1,01 \times 100}{9,8 \times 100} = \frac{101}{980} = 0,103$$

$$\text{d. } 0,00489 \div 1 = 0,00489$$

» 3.2 Practise using number sentences to find solutions

Learner's Book page 23

$$1. \text{ Number of players} = (3 \times 7) + 11 = 32$$

$$\text{Number of tracksuits required} = 32 \times 2 = 64$$

$$\text{Amount of fabric required} = 64 \times 4,5 = 288 \text{ m}$$

$$2. \text{ a. Income} = R7,50 \times 45 = R337,50$$

$$\text{b. Cost of boerwors rolls} = R3,35 \times 45 = R150,75$$

$$\text{Profit} = \text{Income} - \text{Cost}$$

$$= R337,50 - R150,75 = R186,75$$

$$\text{c. 60 rolls at 50c/roll:}$$

They save 35c per roll

A finished boerwors roll

would cost them R3,00.

$$100 \text{ rolls at } 40\text{c/roll:}$$

They save 45c per roll.

A finished boerwors roll

would cost them R2,90.

$$\text{d. Total saving}$$

$$35\text{c} \times 45 = R15,75$$

$$\therefore \text{Profit} = R186,75 + R15,75$$

$$= R202,50$$

$$\text{Total saving:}$$

$$45\text{c} \times 45 = R20,25$$

$$\therefore \text{Profit} = R186,75 + R20,25$$

$$= 207,00$$

- e. Profit on 45 boerewors rolls if 60 rolls were bought at 50c/roll = R202,50; but there will be 15 rolls left over, which should be considered an expenditure: $15 \times 50c = R7,50$
 \therefore Profit = R202,50 – R7,50 = R195,00 which is an increase of R8,25.
 Profit on 45 boerewors rolls if 100 rolls were bought at 40c/roll = R207,00; but there will be 55 rolls left over, which should be considered an expenditure: $55 \times 40c = R22,00$
 \therefore Profit = R207,00 – R22,00 = R185,00 which is a decrease of R1,75.
 \therefore They can buy the rolls in bulk quantities of 60 rolls at 50c/roll.

Unit 4

Doing calculations in the right order

Learner's Book pages 24–27

Duration: 1 hour

Teaching tips

- Errors in the order of calculation are probably the most common form of error for learners, so it is important that they learn the correct order.
- Remember that BODMAS is a useful tool to help learners remember the correct order, but like any rule it is not foolproof. For example:

$$11 - (3 \times 4) + 2$$

According to BODMAS this should be:

$$\begin{aligned} 11 - 12 + 2 & \quad \text{Brackets first} \\ = 11 - 14 & \quad \text{Addition before subtraction} \\ = -3 \end{aligned}$$

But the correct answer is:

$$\begin{aligned} 11 - 12 + 2 \\ = -1 + 2 \\ = 1 \end{aligned}$$

This is because add and subtract actually have the *same* importance as each other (so do of, multiply and divide). So, when faced with a situation like this we should always work from left to right. We could write BODMAS more correctly as:

B – always first
 ODM – do these from left to right
 AS – do these from left to right

Solutions



4.1 Practise using BODMAS and other calculation rules

Learner's Book page 26

- | | |
|---|---|
| <p>1. a. $36 - 8 + (5 \times 2)$
 $= 36 - 8 + 10$
 $= 38$</p> <p>c. $(63 - 7) \times (2 + 7)$
 $= 56 \times 9$
 $= 504$</p> <p>e. $(4 + 3) \times 2 + (5 + 4) \times 4$
 $= 7 \times 2 + 9 \times 4$
 $= 14 + 36$
 $= 50$</p> | <p>b. $(36 - 8 + 5) \times 2$
 $= 33 \times 2$
 $= 66$</p> <p>d. $63 \times (7 \times 2) + 7$
 $= (63 \times 14) + 7$
 $= 882 + 7$
 $= 889$</p> <p>f. $4 + 3 \times 2 + 5 + 4 \times 4$
 $= 4 + 6 + 5 + 16$
 $= 31$</p> |
|---|---|

- g. $(7 + 7) \div 7 + (8 - 6) \div 2$
 $= 14 \div 7 + 2 \div 2$
 $= 2 + 1$
 $= 3$
- h. $7 + 7 \div 7 + 8 - 6 \div 2$
 $= 7 + 1 + 8 - 3$
 $= 13$
2. a. 27,2 b. 272 c. 0,272 d. 0,00272
e. 820 f. 172,1 g. 3 295 h. 0,0701
i. 60 j. 622 k. 4 000 l. 0,04
3. a. Taxi fare – R12
Juice – 3 bottles of 0,5 litre each, per person = $17 \times 3 \times R5 = R255,00$
Bread – 4 slices per person, 6 people per loaf = $3 \times R6,95 = R 20,85$
Cheese – 5 people per block = $5 \times R12,50 = R 62,50$
Choc – 2 people per slab = $9 \times R15 = R135,00$
Airtime = R 44,00
Cost per learner
 $= 12 + (R255 + R20,85 + R62,50 + R135 + R44) \div 17$
 $= R42,43$

Unit 5

Squares, cubes and square roots

Learner's Book pages 28–30

Duration: ½ hour

Teaching tips

- Square and cube numbers should not be difficult for your learners. Square roots sometimes cause problems though.
- The easiest way to explain a square root is to reverse the process of squaring. For example, if $3 \times 3 = 9$, then the square root of 9 is 3.
- Point out to learners that not every number is a perfect square i.e. not all numbers have 'nice' square roots. For example, $\sqrt{2} = 1,41\dots$

Solutions

» 5.1 Practise calculations with squares and cubes

Learner's Book page 30

1. a. $5^2 = 5 \times 5 = 25$
b. $3,2^2 = 3,2 \times 3,2 = 10,24$
c. $34^3 = 34 \times 34 \times 34 = 39\,304$
d. $0,34^3 = 0,34 \times 0,34 \times 0,34 = 0,039304$
e. $15^2 \times 6^3 \times 1^2 = 15 \times 15 \times 6 \times 6 \times 6 \times 1 \times 1$
 $= 5 \times 3 \times 5 \times 3 \times 2 \times 3 \times 2 \times 3 \times 2 \times 3 \times 1 \times 1$
 $= 5 \times 2 \times 5 \times 2 \times 2 \times 3 \times 3 \times 3 \times 3 \times 3 \times 1 \times 1$
 $= 10 \times 20 \times 9 \times 9 \times 3 \times 1$
 $= 200 \times 81 \times 3$
 $= 48\,600$
f. $6,2^2 \times 18,1^3 = 6,2 \times 6,2 \times 18,1 \times 18,1 \times 18,1$
 $= 38,44 \times 5\,929,741$
 $= 227\,939,244$
2. a. $\sqrt{25} = \sqrt{5 \times 5} = 5$
b. $\sqrt{225} = \sqrt{15 \times 15} = 15$
c. $\sqrt{38,44} = \sqrt{6,2 \times 6,2} = 6,2$
d. $\sqrt{1} = \sqrt{1 \times 1} = 1$
3. a. $(3 + 4)^2 \times (2 + 2)^3$
 $= 7^2 \times 4^3$
 $= 49 \times 64$
 $= 3\,136$

$$\begin{aligned}
 \text{b. } & \sqrt{16} \times 72 \times (6 + 4)^3 \\
 & = 4 \times 72 \times 10^3 \\
 & = 288 \times 1\,000 \\
 & = 288\,000 \\
 \text{c. } & \sqrt{100} \div \sqrt{25} \\
 & = \frac{\sqrt{10 \times 10}}{\sqrt{5 \times 5}} \\
 & = \frac{10}{5} \\
 & = 2
 \end{aligned}$$

Unit 6

Calculations with fractions

Learner's Book pages 31–36

Duration: 1 hour

Teaching tips

- Manipulation of fractions is an essential part of mathematical literacy. Fractions should form a regular part of your classroom routine so that your learners work with them confidently.
- Most of the content covered here is material the learners will have worked through in earlier grades, but if their basic mathematics is not strong then they will need to go through this section carefully.
- Be especially aware of your learners' progress through this section and spend as much time as needed offering remediation to those learners that struggle. This unit is vital to future work.

Solutions

» 6.1 Practise calculating with fractions

Learner's Book page 35

- $\frac{2}{7} + \frac{4}{7} = \frac{6}{7}$
 - $\frac{2}{8} + \frac{4}{8} = \frac{6}{8} (= \frac{3}{4})$
 - $\frac{11}{9} - \frac{4}{9} = \frac{5}{9}$
 - $\frac{21}{30} - \frac{3}{30} = \frac{18}{30} (= \frac{3}{5})$
- $\frac{2}{5} \times \frac{1}{6} = \frac{2}{30} (= \frac{1}{15})$
 - $\frac{3}{8} \times \frac{12}{20} = \frac{36}{160} (= \frac{9}{40})$
 - $\frac{5}{12} \div \frac{1}{10} = \frac{5}{12} \times \frac{10}{1} = \frac{50}{12} (= \frac{25}{6})$
 - $\frac{99}{100} \div \frac{3}{2} = \frac{99}{100} \times \frac{2}{3} = \frac{198}{300} (= \frac{33}{50})$
- $\frac{1}{2} = \frac{5}{10}$
 - $\frac{8}{24} = \frac{1}{3}$
 - $\frac{9}{10} = \frac{90}{100}$
 - $\frac{2}{3} = \frac{16}{24}$
 - $\frac{7}{9} = \frac{35}{45}$
 - $\frac{1}{7} = \frac{4}{28}$
- $\frac{7}{10} = 0,7$
 - $\frac{1}{100} = 0,01$
 - $\frac{3}{5} = \frac{6}{10} = 0,6$
 - $\frac{4}{20} = \frac{2}{10} = 0,2$
 - $\frac{12}{50} = \frac{24}{100} = 0,24$
 - $0,\dot{3}$
- $1\frac{1}{10} = 1,1$
 - $5\frac{3}{100} = 5,03$
 - $12\frac{3}{4} = 12,75$
 - $100\frac{1}{100} = 100,01$
 - $99\frac{345}{1\,000} = 99,345$
- $$\begin{aligned}
 & \left(2 + \frac{1}{2} + \frac{1}{4}\right) \times \left(\frac{3}{5} - \frac{1}{10}\right) \\
 & = \left(2 + \frac{2}{4} + \frac{1}{4}\right) \times \left(\frac{6}{10} - \frac{1}{10}\right) \\
 & = \frac{11}{4} \times \frac{5}{10} = \frac{55}{40} = \frac{11}{8}
 \end{aligned}$$

$$\begin{aligned}
 \text{b. } & 4\left(\frac{3}{4} + \frac{2}{8}\right) \times \left(\frac{10}{15} + \frac{1}{6}\right) \\
 & = 4\left(\frac{6}{8} + \frac{2}{8}\right) \times \left(\frac{20}{30} + \frac{5}{30}\right) \\
 & = 4\left(\frac{8}{8}\right) \times \left(\frac{25}{30}\right) \\
 & = 4(1) \times \left(\frac{25}{30}\right) \\
 & = \frac{4}{1} \times \frac{25}{30} \\
 & = \frac{100}{30} = \frac{10}{3}
 \end{aligned}$$

$$\begin{aligned}
 \text{c. } & 3,5 \div \frac{1}{2} + \frac{5}{6} \times \frac{2}{3} \\
 & = 3\frac{1}{2} \div \frac{1}{2} + \frac{10}{18} \\
 & = \frac{7}{2} \times \frac{2}{1} + \frac{10}{18} \\
 & = \frac{14}{2} + \frac{10}{18} \\
 & = 7 + \frac{5}{9} \\
 & = 7\frac{5}{9}
 \end{aligned}$$

$$\begin{aligned}
 \text{d. } & 10 \times 0,5 - 3\left(\frac{24}{30} + \frac{6}{30}\right) \\
 & = 10 \times \frac{1}{2} - 3\left(\frac{30}{30}\right) \\
 & = 5 - 3(1) \\
 & = 5 - 3 \\
 & = 2
 \end{aligned}$$

$$\begin{aligned}
 7. \text{ Length of rope} & = (6 \times 0,3 \text{ m}) + (6 \times \frac{1}{5} \text{ m}) + (1 \times 1\frac{1}{2} \text{ m}) + (4 \times \frac{6}{10} \text{ m}) \\
 & = (6 \times 0,3 \text{ m}) + (6 \times 0,2 \text{ m}) + (1 \times 1,5 \text{ m}) + (4 \times 0,6 \text{ m}) \\
 & = 1,8 \text{ m} + 1,2 \text{ m} + 1,5 \text{ m} + 2,4 \text{ m} \\
 & = 6,9 \text{ m}
 \end{aligned}$$

Yes, there is enough rope to tie the boxes. To have the fewest knots, use the longest piece of rope first.

Unit 7

Using a calculator to add, subtract, multiply and divide

Learner's Book pages 37–45

Duration: 2 hours

Teaching tips

- A calculator is a vital partner in your learners' mathematics journey. Like any tool, a calculator can be improperly used and its value wasted. Since their calculator will be accompanying them through this course, learners need to become familiar with all their calculator's functions. This is an opportunity for them to learn and practise working with their calculator.
- Encourage learners to bring the user manual for their calculator to class. Not all calculators work in the same way, so learners may need to find instructions specific to their own calculator. This will be good practice for them in preparation for the section on reading instructions in Unit 4 of Term 3.
- NOTE: The keystrokes given in the Learner's Book may not work for all calculators. Be sure to warn learners of this. They will need to find the keystrokes specific to their calculator.
- We recommend that learners do not use a scientific calculator. Some of the functions described in the Learner's Book do not work on a scientific calculator. In addition, the extra functions provided by a scientific calculator may confuse some learners.

Solutions

7.1 Practise using the calculator

Learner's Book page 38

- a. 35 b. 52 c. 9 929 d. 671 653
- a. 540 b. 42 504 c. 30 d. 92 820
- a. 24 b. 238 c. 133 d. 5 250
- a. 20 b. 971
- a. 28 b. 200
- a. 336 b. 20

7.2 Practise finding squares, cubes and square roots with a calculator

Learner's Book page 39

- a. 625 b. 56,25 c. 0,04 d. 147 614,2504
Answers correct to 3 decimals
- a. 9,798 b. 14,146 c. 1 000 d. 0,775
- a. 1 728 b. 1 c. 0,000027 d. 160 103 007
- 27 is the square root of 729
- 27 is the cube of 3
- 0,25
- 1,15
- 1 000 000

7.3 Practise using a calculator to work with fractions

Learner's Book page 41

- a. 0,8 b. 0,96 c. 0,692 d. 0,143
- 0,692
- 0,1
- a. 1,036 b. 2,35 c. 8,214 d. 12,168
- a. $3\frac{6}{5} \times 2\frac{1}{2} = 4,2 \times 2,5 \approx 4 \times 2,5 = 10,0$ (Estimate)
 $4,2 \times 2,5 = 10,5$
- b. $12\frac{1}{10} - 6\frac{1}{100} = 12,1 - 6,0 \approx 6,1$ (Estimate)
 $12,1 - 6,01 = 6,09$
- c. $\frac{4}{5} \times 3 \times \frac{21}{25} = 0,8 \times 3 \times 0,8 \approx 1,92$ (Estimate)
 $0,8 \times 3 \times 0,84 = 2,016$
- d. $10\frac{3}{5} \div 2\frac{4}{8} = 10,6 \div 2,5 \approx \frac{11}{2,5} \approx \frac{110}{25} \approx 4,04$ (Estimate)
 $10,6 \div 2,5 = 4,24$

7.4 Practise using the calculator memory functions

Learner's Book page 43

- a. 38 b. 66 c. 504
d. 889 e. 50 f. 31
- a. 90 b. 10 c. 162
d. 1,375 e. 3,333 f. 18,056
g. 2

Teaching tips

- It is important to emphasise here that ratios compare quantities that are measured in the same units (as opposed to rates, which compare quantities with different units of measurement).
- This section should be familiar to learners from earlier work so it should not pose significant problems. However, since fractions are a form of ratio, if learners are not confident with working with fractions they may need more practice.

Solutions



8.1 Practise writing ratios in their simplest form

Learner's Book page 49

- 5 : 3
 - 5 : 11
 - 5 : 2 : 8
- 46 cm to 980 cm = 23 cm to 490 cm
 - 25c to 350c = 1c to 14c
 - 500 m to 1 000 m = 1 m to 2 m
 - 5 000 g to 600 g = 25 g to 3 g
 - 60 minutes to 50 minutes = 6 minutes to 5 minutes
 - 120 000 mg to 600 000 mg to 40 mg = 3 000 mg to 15 000 mg to 1 mg



8.2 Practise finding equivalent ratios

Learner's Book page 49

- c. $25 : 30 = 5 : 6$
- b. $8 : 24 : 20 = 4 : 12 : 10$
- 4 : 10
 - 3 : 4
 - 6 : 12 : 20
 - $35 : 21 = 5 : 3$
 - $14 : 30 : 210 = 7 : 15 : 105$
 - 1 : 5,5 : 102



8.3 Practise writing a ratio in unit form

Learner's Book page 50

- $32 : 24 (\div 24)$
 $= \frac{32}{24} : \frac{24}{24}$
 $= \frac{4}{3} : 1$
 $= 1,3 : 1$
- $19 : 38 : 76 (\div 19)$
 $= 1 : 2 : 4$
- $6 : 14 (\div 6)$
 $= 1 : \frac{14}{6}$
 $= 1 : 2\frac{2}{6}$
 $= 1 : 2,3$
- $200 : 400 : 800 (\div 200)$
 $= 1 : 2 : 4$

$$5. \quad 1,2 : 2,4 : 8,4 (\div 1,2) \\ = 1 : 2 : 7$$

$$6. \quad 0,2 : 6 : 10 (\div 0,2) \\ = 1 : 30 : 50$$

» 8.4 Practise comparing ratios

Learner's Book page 50

1. Ratio of women to men

Mozambique	$98 : 152 = 1 : 1,6$
Rwanda	$45 : 35 = 1 : 0,8$
South Africa	$178 : 222 = 1 : 1,2$
Uganda	$102 : 222 = 1 : 2,2$

 - a. Rwanda has the highest ratio.
 - b. Uganda has the lowest ratio.
2. a. Best Buys Supermarket $12\,500 : 5\,630\,000 = 1 : 450,4$
 Speedy Laundromat $12\,500 : 295\,000 = 1 : 23,6$
 Audio Cellphone Services $12\,500 : 318\,500 = 1 : 25,48$
 Lindelwa and Lucy Coffee Shop $12\,500 : 82\,000 = 1 : 6,6$
 HomeHealth Pharmacy $12\,500 : 462\,000 = 1 : 37$
 - b. A fairer way would be to ask each shop to contribute a small percentage of their annual income.

» 8.5 Practising sharing amounts in a given ratio

Learner's Book page 52

1. $\frac{1}{5} \times 500 \text{ g} = 100 \text{ g}$
 $\frac{4}{5} \times 500 \text{ g} = 400 \text{ g}$
2. $\frac{3}{10} \times 50 \text{ l} = 15 \text{ l}$
 $\frac{5}{10} \times 50 \text{ l} = 25 \text{ l}$
 $\frac{2}{10} \times 50 \text{ l} = 10 \text{ l}$
3. $\frac{9}{54} \times \text{R}660\,000 = \text{R}110\,000$
 $\frac{18}{54} \times \text{R}660\,000 = \text{R}220\,000$
 $\frac{27}{54} \times \text{R}660\,000 = \text{R}330\,000$
4. Hospital A

$\frac{70}{155} \times 120 = 54$ loaves of bread
$\frac{70}{155} \times 200 = 90$ apples
$\frac{70}{155} \times 12 = 6$ braai packs of chicken ($\frac{70}{155} \times 12 = 5,42$; round up to 6)
$\frac{70}{155} \times 150 = 68$ l of milk
$\frac{70}{155} \times 45 = 20$ packets of cheese

Hospital B

$\frac{30}{155} \times 120 = 23$ loaves of bread
$\frac{30}{155} \times 200 = 39$ apples
$\frac{30}{155} \times 12 = 2$ braai packs of chicken
$\frac{30}{155} \times 150 = 29$ l of milk
$\frac{30}{155} \times 45 = 9$ packets of cheese

Hospital C

$\frac{55}{155} \times 120 = 43$ loaves of bread
--

$$\frac{55}{155} \times 200 = 71 \text{ apples}$$

$$\frac{55}{155} \times 12 = 4 \text{ braai packs of chicken}$$

$$\frac{55}{155} \times 150 = 53 \text{ l of milk}$$

$$\frac{55}{155} \times 45 = 16 \text{ packets of cheese}$$

5. Aquarium: $\frac{60}{224} \times R3\ 284 = R879,64$

Food-canning factory: $\frac{120}{224} \times R3\ 284 = R1\ 759,29$

Art gallery: $\frac{44}{224} \times R3\ 284 = \underline{R645,10}$
R3 284,03

6. a. Lisa and Loyisa

$$\frac{3}{13} \times 10 \text{ kg} = 2,308 \text{ kg butter}$$

$$\frac{3}{13} \times 25 \text{ kg} = 5,769 \text{ kg flour}$$

$$\frac{3}{13} \times 12 \text{ kg} = 2,769 \text{ kg mixed raisins and cherries}$$

$$\frac{3}{13} \times 8 \text{ kg} = 1,846 \text{ kg sugar}$$

$$\frac{3}{13} \times 1 \text{ kg} = 0,231 \text{ kg ground almonds}$$

$$\frac{3}{13} \times 500 \text{ ml} = 115 \text{ ml vanilla essence}$$

Sofia

$$\frac{2}{13} \times 10 \text{ kg} = 1,538 \text{ kg butter}$$

$$\frac{2}{13} \times 25 \text{ kg} = 3,846 \text{ kg flour}$$

$$\frac{2}{13} \times 12 \text{ kg} = 1,846 \text{ kg mixed raisins and cherries}$$

$$\frac{2}{13} \times 8 \text{ kg} = 1,231 \text{ kg sugar}$$

$$\frac{2}{13} \times 1 \text{ kg} = 0,154 \text{ kg ground almonds}$$

$$\frac{2}{13} \times 500 \text{ ml} = 77 \text{ ml vanilla essence}$$

Zanele

$$\frac{5}{13} \times 10 \text{ kg} = 3,846 \text{ kg butter}$$

$$\frac{5}{13} \times 25 \text{ kg} = 9,615 \text{ kg flour}$$

$$\frac{5}{13} \times 12 \text{ kg} = 4,615 \text{ kg mixed raisins and cherries}$$

$$\frac{5}{13} \times 8 \text{ kg} = 3,077 \text{ kg sugar}$$

$$\frac{5}{13} \times 1 \text{ kg} = 0,385 \text{ kg ground almonds}$$

$$\frac{5}{13} \times 500 \text{ ml} = 192 \text{ ml vanilla essence}$$

b. Yes, there will be ingredients left over.



8.6 Practise finding exact quantities using ratios

Learner's Book page 54

1. a. $\frac{12}{32} = 15 \text{ kg}$

$$\therefore \frac{1}{32} = \frac{15}{12} = 1,25 \text{ kg}$$

$$\begin{aligned} \text{Amount of Chinese tea} &= \frac{20}{32} \\ &= 20 \times 1,25 \text{ kg} \\ &= 25 \text{ kg} \end{aligned}$$

b. $\frac{20}{32} = 20 \text{ kg}$

$$\therefore \frac{1}{32} = 1 \text{ kg}$$

$$\text{Amount of Indian tea} = \frac{12}{32}$$

$$= 12 \times 1 \text{ kg}$$

$$= 12 \text{ kg}$$

2. Ratio Quantities
1 : 5 15 kg : 75 kg
2 : 3 15 g : 75 g
5 : 4 20 m : 16 m
3 : 8 120 g : 320 g

3. cotton : polyester = 7 : 3
 = 56 : 24

They must order 56 kg of cotton.

4. a. $\frac{2}{5} \times 350 = 140$ g copper

$$\frac{2}{5} \times 350 = 140 \text{ g nickel}$$

$$\frac{1}{5} \times 350 = 70 \text{ g zinc}$$

- b. copper : nickel : zinc = 2 : 2 : 1
 = 3 : 3 : 1,5

3 g of copper and 1,5 g of zinc are needed.

5. a. males : females = 3 : 27
 = 15 : 135

There are 135 females.

- b. Total number of males = 15 + 7 = 22

Males : females = 3 : 27

$$\frac{3}{30} = 22$$

$$\therefore \frac{1}{30} = \frac{22}{3}$$

$$\text{Total number of females} = \frac{27}{30} = 27 \times \frac{22}{3} = 198$$

Farmer should buy $(198 - 135) = 63$ females to keep the ratios the same.

Unit 9 Proportion

Learner's Book pages 55–59

Duration: 1½ hours

Teaching tips

- Proportion forms the heart of functions and relationships, so working with proportion is a vital set of skills that is developed later.
- Direct proportion is represented by a straight-line graph through the origin. So, this could be a useful point to begin discussing and comparing graphs. Remember: direct proportion occurs when equivalent ratios are formed between two sets of quantities.

Solutions



9.1 Practise working with proportion

Learner's Book page 58

- a. $2 \times R2,40 = R4,80$
b. $8 \times R2,40 = R19,20$
c. $5 \times R2,40 = R12,00$
2. Three tins of blue paint and twelve tins of yellow paint
3. Amount of salt from fish: 50 mg per 100 g
 = 125 mg per 250 g

Amount of salt from potato chips: 1 g per 100 mg
 $= 4 \text{ g per } 400 \text{ g}$
 Amount of salt from tomato sauce: 0,5 g per tablespoon
 $= 1 \text{ g per } 2 \text{ tablespoons}$
 Total amount of salt = 125 mg + 4 g + 1 g
 $= 0,125 \text{ g} + 4 \text{ g} + 1 \text{ g} = 5,125 \text{ g}$

The meal does not exceed more than his daily allowance.

4. a. It will cost $R2,40 \times 200$
 b. Direct proportion
 5. Number of trees which each person must plant = $\frac{120}{7}$
 $= 17,14$

They must each plant 17 trees and one person will have to plant 18 trees.

6. Mulch : fertiliser = 3,5 : 4,5
 a. For 120 trees: $3,5 \times 120 = 420 \text{ kg mulch}$
 $4,5 \times 120 = 540 \text{ kg fertiliser}$
 b. For 15 extra trees: $3,5 \times 15 = 52,5 \text{ kg mulch}$
 $4,5 \times 15 = 67,5 \text{ kg fertiliser}$
 c. Direct proportion

7. $\frac{2}{5} \times 30 = 12 \text{ l fruit juice}$
 $\frac{3}{5} \times 30 = 18 \text{ l soda water}$

8. $R130 \times 8 = R1\ 040$
 Even if she is only able to attend 8 matches, buying a season ticket is a better buy.

Unit 10 Rates

Learner's Book pages 60–74

Duration: 1 hour

Teaching tips

- Emphasise that a rate works in the same way as a ratio, except that the quantities being compared have different units.

Solutions

» 10.1 Practise converting rates from one measuring unit to another

Learner's Book page 63

1. a. $R5,60/60 \text{ seconds} = x/\text{second}$
 $\therefore \frac{R5,60}{60} = \frac{x}{1}$
 Cost per second = 9,3c/second
 b. $R5,60/1 \text{ minute} = x/60 \text{ minutes}$
 $\therefore \frac{R5,60}{1} = \frac{x}{60}$
 $R5,60 \times 60 = x$
 $\therefore R336,00 = x$
 Cost per hour = R336,00/hour
2. a. $R7,85/100 \text{ cm} = x/1 \text{ cm}$
 $\therefore \frac{R7,85}{100} = \frac{x}{1}$
 Cost of wire per cm = 7,85c (per cm)
 $= 8\text{c (per cm)}$
 R7,85/1 m

b. $R7,85/0,001 \text{ km} = x/1 \text{ km}$

$$\frac{R7,85}{0,001} = \frac{x}{1}$$

$$\therefore R7\ 850,00 = x$$

Cost of wire per km = R7 850,00 (/km)

3. 400 g butter costs R17,95

$$400 \text{ g} : R17,95 = 1\ 000 \text{ g} : x$$

$$\frac{400}{R17,95} = \frac{1\ 000}{x}$$

$$\therefore x = \frac{1\ 000 \times R17,95}{400}$$

$$\therefore x = R44,88$$

Cost of kg butter = R44, 88 (per kg)

4. a. $R210,00 : 50 \text{ ml} = x : 1\ 000 \text{ ml}$

$$\frac{R210}{50} = \frac{x}{1\ 000}$$

$$\therefore \frac{R210 \times 1\ 000}{50} = x$$

$$R4\ 200 = x$$

Cost of 1 ℓ = R4 200

b. $R210,00 : 50 \text{ ml} = x : 120 \text{ ml}$

$$\frac{R210,00}{50} = \frac{x}{125}$$

$$\frac{R210,00 \times 125}{50} = x$$

$$R525,00 = x$$

Cost of 125 ml = R525,00

» 10.2 Practise calculating cost rates

Learner's Book page 63

1. a. $\frac{R56}{8} = R7$ per plank

b. $\frac{R34,60}{5} = R6,92$ per m

c. $\frac{R44,00}{8} = R5,50$ per seedling tree

2. $\frac{R25,02}{6} = R4,17$ per ℓ

3. $\frac{R820}{2\ 500} = 33c$ per km

4. Starking $\frac{R2,95}{\text{kg}}$

Golden delicious $\frac{R7,50}{3,5} = R2,14$ per kg

Golden delicious are cheaper.

5. Bricklayer: $\frac{R504,00}{8} = R63$ per hour

Painter: $\frac{R720,00}{10} = R72$ per hour

The painter is better paid.

6. Orange juice: $\frac{R18,95}{2} = R9,48$ per ℓ

Cola: $\frac{R14,50}{1,5} = R9,67$ per ℓ

Orange juice is cheaper.

» 10.3 Practise working out 'best buys'

Learner's Book page 63

Class discussion

Some factors to consider:

- price
- quantity/amount
- organic or not
- pre-prepared or raw
- preferred flavour or brand



10.4 Practise calculating consumption rates

Learner's Book page 68

1. a. $x : 410 = 40 : 32$
 $\therefore \frac{x}{410} = \frac{40}{32}$
 $\therefore x = \frac{40 \times 410}{32}$
 $x = 512,5 \text{ km}$
- b. $x : 32 = 100 : 410$
 $\therefore \frac{x}{32} = \frac{100}{410}$
 $\therefore x = \frac{100 \times 32}{410}$
 $x = 7,8 \text{ ℓ}$
- c. No. These are average rates as we don't know what speed the car is travelling at. The faster a car travels, the more petrol it uses.
2. a. Assume baby elephants eat 149 kg vegetation daily and adult elephants eat 169 kg vegetation daily.
Amount of vegetation required per week
 $= 7(149 \times 3 + 169 \times 8)$
 $= 12\,593 \text{ kg}$
- b. Assume a baby elephant drinks 68,4 ℓ water per day and an adult drinks 98,8 ℓ per day.
Amount of water per day $= 3 \times 68,4 \text{ ℓ} + 8 \times 98,8 \text{ ℓ}$
 $= 995,6 \text{ ℓ}$
- c. $11 \times 152 \text{ ℓ} = 1\,672 \text{ ℓ}$
- d. $30(2 \times 212 \text{ ℓ}) = 12\,720 \text{ ℓ}$ (assuming 30 days in a month)



10.5 Practise finding information about consumption rates

Learner's Book page 69

1. ① 6 000 m² rainforest lost/second
② 137 plant, animal and insect species lost/day
③ 50 000 species lost/year
④ Half of the world's species of plants, animals and micro-organisms destroyed/25 years
⑤ 25 Western medicines/100 developed using rainforest ingredients
2. Each learner will do their own calculations.



10.6 Practise calculating distance, speed and time

Learner's Book page 74

1. a. $\text{Speed} = \frac{\text{distance}}{\text{time}}$
 $= \frac{1,3 \text{ m}}{12 \text{ minutes}}$ Estimated answer: 0,1 m/minute
Accurate answer: 0,11 m/minute
- b. Average speed. The worm will not always be moving at the same speed.
2. Sunday: $\text{speed} = \frac{\text{distance}}{\text{time}} = \frac{50 \text{ km}}{\frac{36}{60} \text{ h}} = \frac{50 \text{ km}}{0,6 \text{ h}} = 83,3 \text{ km/h}$
Monday: $\text{speed} = \frac{50 \text{ km}}{1\frac{3}{4} \text{ h}} = 28,6 \text{ km/h}$
Difference in speed $= 83,3 - 28,6 = 54,7 \text{ km/h}$
3. Distance $= \text{speed} \times \text{time}$
 $= 115 \text{ km/h} \times \left(\frac{76}{60}\right) \text{ h}$
 $= 145,7 \text{ km}$

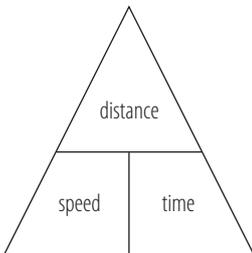
4. From	To	Distance (km)	Depart	Arrive	Time (h)	Ave speed (km/h)
Cape Town	Johannesburg	1 264	14h10	16h10	2	$\frac{1\,264}{2} = 632$
Bloemfontein	Johannesburg	374	07h45	08h50	$1\frac{5}{60} = 1,08$	$\frac{374}{1,08} = 346$
Johannesburg	Bulawayo	672	11h45	13h10	$1\frac{25}{60} = 1,42$	$\frac{672}{1,42} = 474$
Johannesburg	Cairo	6 234	21h45	05h40	$7\frac{55}{60} = 7,92$	$\frac{6\,234}{7,92} = 787$
Cape Town	London	9 634	18h45	06h20	$11\frac{25}{60} = 11,42$	$\frac{9\,634}{11,42} = 844$

Suggestion: The average speeds could be different because different types of aeroplane are used, which have different speeds. Also, wind might slow down or speed up an aeroplane, depending on which direction it is travelling.

Unit 11 Percentages

Learner's Book pages 75–88

Duration: 4½ hours



Teaching tips

- This is the first time learners will have worked with a formula in Grade 10. Spend time showing them how to rearrange the formula, or you can make use of this triangle to help.
- Percentages depend on learners' confidence with fractions, so you may need to revise these before you begin this section.
- Calculators are a very valuable tool for calculating percentages, but be sure that learners can work both by hand and by calculator equally confidently.
- Percentage increase and decrease have a useful everyday application in working with discounts (such as cash discounts or sales) and increases (such as salary increases or annual increases).
- Learners often find it difficult to calculate the original value before a percentage decrease or increase. More practice may need to be given here. Making use of x as the original amount often simplifies things for learners – it is a method that we highly recommend.

Solutions



11.1 Practise converting numbers to percentages

Learner's Book page 79

- 65%
 - 32,5%
 - 7%
 - 3,5%
 - 38,3%
 - 25%
 - 60%
 - 33%
- 56%
 - 70%
 - 4%
 - 145%
 - 432%
 - 70,7%
 - 21 268%
 - 0,34%
- If an item costs R5, then a 100% increase in the price would be R5, giving a new price of R10.

A 100% increase = 100% of R5

$$= \frac{100}{100} \times R5$$

$$= R5$$

A 200% increase = 200% of R5

$$= \frac{200}{100} \times 5$$

$$= R10$$

New price would be R15.



11.2 Practise calculating percentages using a calculator

Learner's Book page 79

- 112,5
 - 0,204
 - 6 603,1
 - 0,0552
 - 12
 - 30,6
 - 817,5
 - 990
- 62,5%
 - 80%
 - 75%
 - 97,8%
- Both the same
 - 60% of R1 200
 - 12% of R100
- $\frac{35}{100} \times 220 \text{ g} = 77 \text{ g}$ of cocoa butter
 $\frac{18}{100} \times 220 \text{ g} = 39,6 \text{ g}$ of sugar
- $\frac{76}{100} \times 254\,000 = 193\,040$ people in 1994
 $\frac{64}{100} \times 320\,000 = 204\,800$ people in 2008
 The number of people optimistic about the future increased from 1994 to 2008.
- $\frac{42}{100} \times 35\,000 = 14\,700$ drive cars to work.
 $\frac{27}{100} \times 14\,700 = 3\,969$ use parking garages.
 $14\,700 - 3\,969 = 10\,731$ cars park on the street.



11.3 Practise increase and decreasing a value by a percentage

Learner's Book page 82

- $\frac{62}{100} \times 200 = R124$
 $R200 + R124 = R324$
 - $\frac{87}{100} \times 350 = R304,50$
 $R350 + R304,50 = R654,50$
 - $\frac{23}{100} \times 0,9 = 0,207$
 $0,9 + 0,207 = 1,107$
 - $\frac{0,8}{100} \times 15 = 0,12$
 $15 + 0,12 = 15,12$
- $R200 - R124 = R76$
 - $R350 - R304,50 = R45,50$
 - $0,9 - 0,207 = 0,693$
 - $15 - 0,12 = 14,88$
- $\frac{12,5}{100} \times 25\,684\,400 = 3\,210\,550$
 Population in 2015: $25\,684\,400 + 3\,210\,550 = 28\,894\,950$
- $\frac{15}{100} \times R159\,000 = R23\,850$
 Value after 1 year = $R159\,000 - R23\,850 = R135\,150$
 - $\frac{15}{100} \times R135\,150 = R20\,272,50$
 Value after 2 years = $R135\,150 - R20\,272,50 = R114\,877,50$
 $\frac{15}{100} \times R114\,877,50 = R17\,231,63$
 Value after 3 years = $R114\,877,50 - R17\,231,63 = R97\,645,88$



11.4 Practise expressing one number as a percentage of another number

Learner's Book page 84

- $\frac{19}{20} \times \frac{100}{1} = 95\%$
 - $\frac{28}{45} \times \frac{100}{1} = 62,22\%$
 - $\frac{2,5}{10} \times \frac{100}{1} = 25\%$
- $\frac{127}{351} \times \frac{100}{1} = 36,18\%$
 - $\frac{84}{96} \times \frac{100}{1} = 87,5\%$
 - $\frac{96}{254} \times \frac{100}{1} = 37,80\%$
- $\frac{30c}{180c} \times \frac{100}{1} = 16,67\%$
 - $\frac{300 \text{ g}}{2\,000 \text{ g}} \times \frac{100}{1} = 15\%$
 - $3,5 \text{ hours} = 210 \text{ minutes}$
 $\frac{50 \text{ minutes}}{210 \text{ minutes}} \times \frac{100}{1} = 23,81\%$
 - $\frac{14}{6 \times 7} \times \frac{100}{1} = \frac{14 \text{ days}}{42 \text{ days}} \times \frac{100}{1} = 33,33\%$

- e. $\frac{5 \text{ cm}}{100 \text{ cm}} \times \frac{100}{1} = 5\%$
 f. $\frac{125 \text{ ml}}{5\,000 \text{ ml}} \times \frac{100}{1} = 2,5\%$

11.5 Practise finding percentage increase and decrease

Learner's Book page 85

- $R8 - R6 = R2$ Percentage increase = $\frac{2}{6} \times \frac{100}{1} = 33,33\%$
 - $R18,00 - R14,50 = R3,50$
Percentage increase = $\frac{R3,50}{R14,50} \times \frac{100}{1} = 24,14\%$
 - The taxi fare has the biggest percentage increase.
- $R1\,280 - R895 = R385$ Percentage increase = $\frac{385}{895} \times \frac{100}{1} = 43,02\%$
 - $R980 - R740 = R240$ Percentage increase = $\frac{240}{740} \times \frac{100}{1} = 32,43\%$
 - $R2\,550 - R1\,960 = R590$ Percentage increase = $\frac{590}{1\,960} \times \frac{100}{1} = 30,10\%$
 - $R2\,100 - R1\,400 = R700$ Percentage increase = $\frac{R700}{R1\,400} \times \frac{100}{1} = 50\%$
 - $R1\,840 - R1\,350 = R490$ Percentage increase = $\frac{490}{1\,350} \times \frac{100}{1} = 36,30\%$
 - $R1\,820 - R1\,040 = R780$ Percentage increase = $\frac{780}{1\,040} \times \frac{100}{1} = 75\%$
- $R35 - R21 = R14$ Percentage decrease = $\frac{R14}{R35} \times \frac{100}{1} = 40\%$
 - $R55 - R36 = R19$ Percentage decrease = $\frac{R19}{R55} \times \frac{100}{1} = 34,55\%$
 - $R39,99 - R14,99 = R25$ Percentage decrease = $\frac{R25}{R39,99} \times \frac{100}{1} = 62,52\%$
 - Buy just after Christmas at the sales and put it away until next Christmas.
- $232 - 160 = 72$ Percentage increase = $\frac{72}{160} \times \frac{100}{1} = 45\%$
 - $R9\,730 - R7\,800 = R1\,930$ Percentage increase = $\frac{1\,930}{7\,800} \times \frac{100}{1} = 24,74\%$

The percentage increase in the money collected is less than the percentage increase in the number of people attending. A reason for this could be that this year the tickets were cheaper than the year before.

11.6 Practise finding the original value

Learner's Book page 87

- $x : 78 = 100 : 115$
 $\therefore \frac{x}{78} = \frac{100}{115}$
 $\therefore x = \frac{100}{115} \times 78$
 $x = 67,83 \text{ kg}$
- $x : R99,95 = 100 : 60$
 $\therefore \frac{x}{99,95} = \frac{100}{60}$
 $\therefore x = \frac{100}{60} \times 99,95$
 $x = 166,58$
 - $x : 280 = 100 : 65$
 $\therefore \frac{x}{280} = \frac{100}{65}$
 $\therefore x = \frac{100}{65} \times 280$
 $x = 430,77$
- $x : 30 = 100 : 25$
 $\therefore \frac{x}{30} = \frac{100}{25}$
 $\therefore x = \frac{100}{25} \times 30$
 $x = R120$
- $x : 684\,000 = 100 : 114$
 $\frac{x}{684\,000} = \frac{100}{114}$
 $\therefore x = \frac{100}{114} \times 684\,000$
 $x = R600\,000$ Price of South African car excluding VAT

$$x : 445\,000 = 125 : 100$$

$$\therefore \frac{x}{445\,000} = \frac{125}{100}$$

$$\therefore x = \frac{125}{100} \times 445\,000$$

$$x = R556\,250$$

- b. It is best for Ntone to import the car from Japan because it is cheaper.

Unit 12

Making sense of graphs that tell a story

Learner's Book pages 89–97

Duration: 4½ hours

Teaching tips

- This unit aims to expose learners to a broad variety of types of graph. The purpose is to get them to see that information can be presented in many different ways.
- Learners are not required to give detailed numerical answers here. It is more important for them to describe what each graph shows and to look critically at the type of graph chosen.
- This would be a good time to introduce learners to the idea that sometimes graphs can be misleading, either by accident or intentionally.

Solutions

» 12.1 Practise finding information on a pictograph

Learner's Book page 89

1. It tells you about the volume of air traffic at major airports in December.
2. 100 flights
3. 50 flights are represented by half an aeroplane.

» 12.2 Practise finding information on a pie chart

Learner's Book page 90

1. How lions spend a typical day
2. One whole day
3. Just over $\frac{3}{4}$ of the day

» 12.3 Practise finding information on a bar graph

Learner's Book page 91

1. The type of financial service used by different families
2. The percentage of households interviewed which use a particular financial service
3. It is labelled on the horizontal axis.
4. No you can't. Some households will use several financial services.

» 12.4 Practise finding information on a line graph

Learner's Book page 92

1. The graph shows the average increase in the mass of a baby in relation to the time after their birth.
2. Mass and time after birth in weeks
3. 4 800 g
4. The mass increases.

» 12.5 Practise looking critically at a creative graph

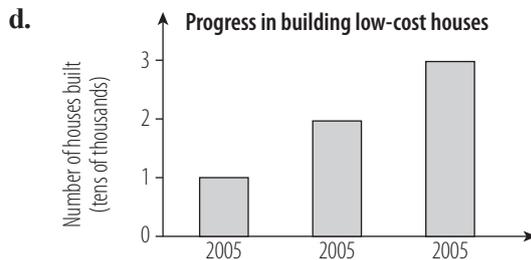
Learner's Book page 92

1. Call time and call cost
2. This is a creative graph and therefore not mathematically correct.
3. Because the axes are not labelled and they have no scale
4. To create a visual image which shows the figures/costs in a positive light, which is more often than not misleading and an incorrect representation of the situation

» 12.6 Practise working out what story a graph is telling

Learner's Book page 94

1.
 - a. The graphs show you the number of thefts of motor vehicles or motorcycles and the number of thefts out of or from a motor vehicle respectively over a number of years.
 - b. They represent different situations.
 - c. The years for which the statistics have been collected
 - d. The number of thefts have been labelled on the graph itself.
 - e. Using a line graph shows the general trend more clearly.
2.
 - a. The graph shows the progress in building low-cost houses between 2005 and 2011.
 - b. If you study the graph closely by reading the values, it is quite accurate and clear. At a quick glance it is misleading because of the way the houses have been drawn.
 - c. It gives the impression that the progress in building low-cost houses is far greater than it actually is.



» 12.7 Practise interpreting the shape and direction of graphs

Learner's Book page 96

1. The cost of apples remains constant over time.
The cost of grapes increases sharply to begin with, remains constant at the higher price for a while and then decreases sharply back to the original price.
The cost of watermelons starts off quite high and remains at that price for a short while. The price then decreases quite sharply to a lower price and remains at the lower price for a short while. The price then increases sharply again and the price of watermelons rises quite well above the original high starting price.
2.
 - a. 9 months
 - b. $\pm 23\%$
 - c. June
 - d. June-July
 - e. October
 - f. 69%
 - g. From February to June the woman spends less than 25% of her income to repay her debt. By June she has cleared her debt but then goes into debt again in July when she has to pay 58% of her income in debt repayment. By September she has reduced the debt so that she is only

paying 27% of her income in debt repayments. Further purchases in September increase her debt again so that in October she is spending 69% of her income on debt repayment. By November her debt has been reduced quite considerably so that she is spending only 12% of her income in debt repayment.

Unit 13 Patterns and relationships

Learner's Book pages 98–109

Duration: 4½ hours

Teaching tips

- In this unit, learners are led through examples of common types of mathematical relationship. Encourage learners to look for patterns in each of the examples given – when a pattern is observed it means that a relationship exists. Once we can describe the relationship mathematically we can use that description to predict values.
- You can refer back to Unit 9 (Proportion) when dealing with relationships with a constant difference (specifically direct proportion).
- Encourage learners to look for the equivalence of different forms of expressing a relationship: in words, as an equation, as a table of values or as a graph. This is covered in Unit 14.

Solutions



13.1 Practise working with constant differences

Learner's Book page 100

- Relationship A:**
1. As the area of the floor (in m^2) increases, there is a constant increase of 9 in the number of tiles needed.
 2. Independent variable – area of floor (m^2)
Dependent variable – number of tiles needed
 3. Directly proportional relationship
- Relationship B:**
1. As the number of litres of petrol increases (by 20 ℓ) there is a constant increase of R184.
 2. Independent variable – litres of petrol
Dependent variable – cost
 3. Directly proportional relationship
- Relationship C:**
1. As the number of tables increases, there is a constant increase of 4 in the number of chairs.
 2. Independent variable – number of tables
Dependent variable – number of chairs
 3. Directly proportional relationship
- Relationship D:**
1. As the number of people increases (in groups of 25), there is a constant increase of R50 in the cost.
 2. Independent variable – number of people
Dependent variable – cost
 3. Directly proportional relationship
- Relationship E:**
1. As the number of US dollars increases, there is a constant increase of R6,91 in the rand value.
 2. Independent variable – US dollars
Dependent variable – rand
 3. Directly proportional relationship
- Relationship F:**
1. As the temperature increases in degrees Celsius, it also increases in degrees Fahrenheit.

2. Independent variable – Temperature (°C)
Dependent variable – Temperature (°F)
3. Directly proportional relationship

» 13.2 Practise working with inversely proportional relationships

Learner's Book page 101

1.
 - a. As the length increases, the breadth must decrease in the same proportion to keep a constant area.
 - b. The length or the breadth
2.
 - a. The more the items cost, the fewer you can buy.
 - b. The number of items you can buy
3.
 - a. The greater the length of the calls you make, the less calls you are able to make.
 - b. The number of calls you can make
4.
 - a. The greater the length of the pieces of fabric, the less pieces you can cut.
 - b. The number of pieces of fabric that you can cut
5.
 - a. The more people there are using the bus, the less the cost per person.
 - b. Cost per person

» 13.3 Practise finding the missing terms

Learner's Book page 103

1. 5 seconds: distance = 11 cm
6 seconds: distance = 13 cm
20 seconds: distance = 41 cm
2. For 4 hours, Sindi earns $4 \times R25,50 = R102,00$
For 8 hours, Sindi earns $8 \times R25,50 = R204,00$
3. $C = 180 + 25m$
 12 m²: $C = 180 + 25(12) = R480$
 15 m²: $C = 180 + 25(15) = R555$
 24 m²: $C = 180 + 25(24) = R780$
 30 m²: $C = 180 + 25(30) = R930$
 40 m²: $C = 180 + 25(40) = R1\ 180$
 55 m²: $C = 180 + 25(55) = R1\ 555$
 100 m²: $C = 180 + 25(100) = R2\ 680$
 108 m²: $C = 180 + 25(108) = R2\ 880$

» 13.4 Practise describing relationships in words

Learner's Book page 104

1. Learners' own descriptions
2.
 - a. The cost is R1,70 per item.
 - b. The grass is 14 mm long. It will grow at a rate of 2 mm per day.
 - c. The pay is R23 per hour.
 - d. A journey is 120 km. The time it takes will depend on the speed you travel at. If you double your speed from 60 km per hour to 120 km per hour, the time will halve from 7 hours to 3,5 hours.

3. a.

Hours worked	1	2	3	4	5
Total pay (R)	135	270	405	540	675

b.

Number of minutes	1	2	3	4	5
Number of ml	5	10	15	20	25

c.	Litres of water	1	2	3	4	5
	Volume of squash (ml)	25	50	75	100	125

d.	Number of km	0	1	2	3	4
	Cost (R)	200	202	204	206	208

e.	Mass of chicken (kg)	1	2	3	4	5
	Volume of medicine (ml)	25	50	75	100	125

» 13.5 Practise generating patterns from pictures

Learner's Book page 106

1. a.	Length of path (m)	1	2	3	4	5	10
	Number of grey tiles	16	32	48	64	80	160
	Number of black tiles	4	8	12	16	20	40

b. For every 1 m of path you need 16 grey tiles and 4 black tiles.

c. Number of black tiles = $4m$

Number of grey tiles = $16m$

where m = length of path in metres

2. a. Formula for number of matches is $m = 1 + 3n$

where n represents the number of squares

For 25 squares: $m = 1 + 3(25) = 76$ matches

b. Formula: $m = 2 + 3n$

For 25 shapes: $m = 2 + 3(25) = 77$ matches

c. Formula: $m = 1 + 2n$

For 25 triangles: $m = 1 + 2(25) = 51$ matches

d. Formula: $m = 8n$

For 25 shapes: $m = 8(25) = 200$ matches

» 13.6 Practise generating patterns from written instructions

Learner's Book page 108

1.	Area of wall (m ²)	5	10	20	40	100
	Amount of paint (ℓ)	2	4	8	16	40

2.	Number of pounds (£)	1	100	200	500	1 000
	Cost (R)	11,15	1 115	2 230	5 575	11 150

» 13.7 Practise generating a pattern from a formula

Learner's Book page 109

1.	Time (minutes)	1	2	3	4	5	6	7	8	9	10
	Cost (R)	0,46	0,92	1,38	1,84	2,30	2,76	3,22	3,68	4,14	4,60

2. a.	Number of clients	1	2	3	4	5	6	7
	Daily earnings (R)	190	230	270	310	350	390	430

b. Nomi's daily earning increase by R40 for each additional client she sees.

c. Independent variable: number of clients

Dependent variable: daily earnings (R)

d. Yes, this is a linear relationship. As the number of clients increases by 1, Nomi's daily earnings increase by R40. If you were to draw a graph of these values, you would get a straight line.

Unit 14

Representations of relationships in tables, equations and graphs

Learner's Book pages 110–117

Duration: 4½ hours

Teaching tips

- This unit expands on the work covered in the previous unit, specifically linking different representations of the same relationship.
- Collect everyday examples of pattern or relationships and ask the class to rewrite them in different but equivalent forms.

Solutions

» 14.1 Practise interpreting different representations of relationships

Learner's Book page 112

- | | |
|------|------|
| 1. e | 2. d |
| 3. c | 4. f |
| 5. a | 6. b |

» 14.2 Practise generating a table of values from a graph

Learner's Book page 114

1.

Time between lightning and thunder (s)	100	200	300	400	500	600	700	800	900	1 000	1 100	1 200
Distance away (km)	33,3	66,6	100	133,3	166,6	200	233,3	266,6	300	333,3	366,6	400

2. a.

Time (min)	0	10	20	30	40	50	60	70	80	90	100
Volume of petrol in tanker (ℓ)	2 000	1 800	1 600	1 400	1 200	1 000	800	600	400	200	0

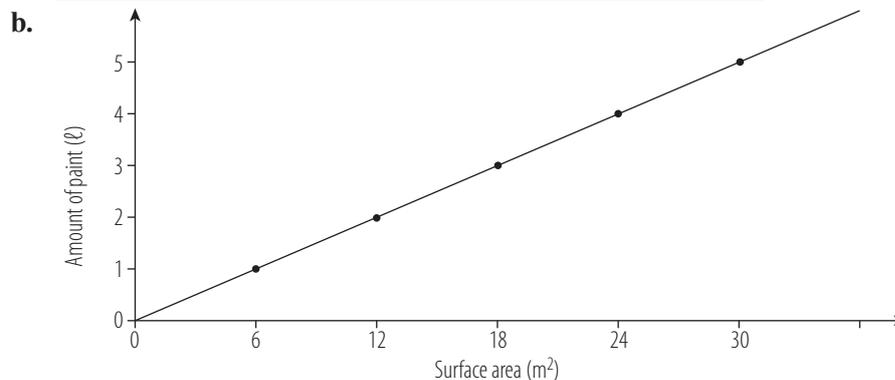
- b. 2 000 ℓ
c. 800 ℓ
d. 100 minutes

» 14.3 Practise generating graphs from a table of values

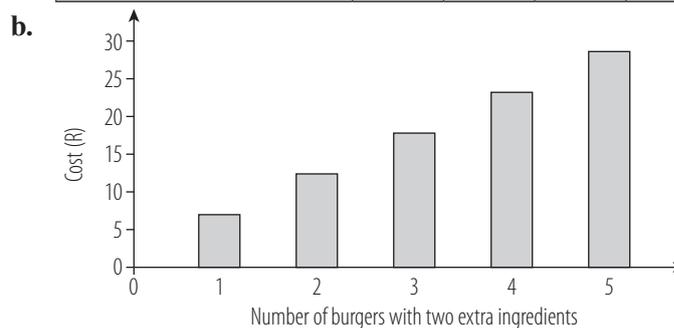
Learner's Book page 117

1. a.

Surface area (m ²)	6	12	18	24	30
Amount of paint (ℓ)	1	2	3	4	5



2. a.	Number of hamburgers (each with two extras)	1	2	3	4	5
	Cost (R)	7,10	12,60	18,10	23,60	29,10



Unit 15

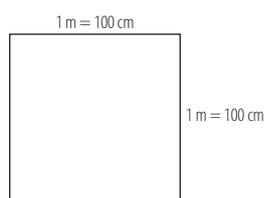
Conversion of measuring units

Learner's Book pages 118–124

Duration: 1½ hours

Teaching tips

- Using the conversion table supplied, learners should not find it difficult to convert between metric units.
- Many learners expect there to be 100 cm² in 1 m² and 1 000 m³ in 1 km³. You may want to explain why this is not the case. For square units you can do it like this:



$$\begin{aligned}
 \text{Area} &= 1 \text{ m}^2 \\
 &= 1 \text{ m} \times 1 \text{ m} \\
 &= 100 \text{ cm} \times 100 \text{ cm} \\
 &= 10\,000 \text{ cm}^2
 \end{aligned}$$

- Learners should be made aware that the metric system is only one system of measurement. We use it because it is convenient (all the conversions are multiples of 10) and because it is standardised (it is the same all over the world). However, other systems are used now or have been in the past. These systems also have their own strengths and weaknesses.

Solutions



15.1 Practise converting measuring units

Learner's Book page 120

- | | |
|---|--|
| 1. a. 0,6 m = 60 cm | b. 0,6 m = 0,0006 km |
| c. 0,6 km = 600 000 mm | d. 42,5 mm = 4,25 cm |
| e. 12,12 km = 12 120 m | f. 38,91 m = 38 910 mm |
| 2. a. 53 g = 0,053 kg | b. 0,7 kg = 700 g |
| c. 0,7 g = 700 mg | d. 74 528 kg = 74,528 t |
| e. 0,839 t = 839 000 g | f. 2,01 kg = 2 010 mg |
| 3. a. 500 ml = 0,5 ℓ | b. 3,95 ℓ = 3 950 ml |
| c. 0,4 ℓ = 400 ml | d. 21 ℓ = 0,021 kl |
| e. 4 300 ml = 4,3 ml | f. 690 500 ml = 0,6905 kl |
| 4. a. 300 cm ² = 0,03 m ² | b. 57 m ² = 570 000 cm ² |
| c. 0,332 km ² = 332 000 m ² | d. 35 cm ³ = 35 000 mm ³ |
| e. 0,04 m ³ = 40 000 cm ³ | f. 731 mm ³ = 0,731 cm ³ |



15.2 Practise working with measuring units

Learner's Book page 123

1. a. cm b. cm c. km
d. cm e. mm f. m
2. a. tonnes b. kg c. g
d. mg e. g f. kg
3. a. cm² b. m² c. ml
d. kl e. m² f. mm³
g. mm³ h. ml i. m²
j. km²
4. a. Day 3

b.

Day	Mass of each box (kg)	Number of boxes	Total mass of load (kg)	Truck mass (t)	Total mass (t)
1	4,5	200	900 kg = 0,9 t	2,65	3,55
2	4,5	180	810 kg = 0,81 t	2,65	3,46
3	4,5	220	990 kg = 0,99 t	2,65	3,64

5. a. Not very accurate
b. i. 15 ml ii. 125 ml iii. 62,5 ml
iv. 62,5 ml v. 56,25 ml vi. 2,5 ml
6. Class discussion

Unit 16

Measuring time

Learner's Book pages 125–137

Duration: 3 hours

Teaching tips

- Time measurement can be more complicated than other conversions for learners because it has a variety of conversion factors (most commonly multiples of 60). For example, 12 minutes is twelve-sixtieths of an hour and not twelve-hundredths. Likewise, 1,2 hours is 1 hour 12 minutes, not 1 hour 2 minutes. Learners will often make this mistake when they use their calculators to convert.
- Try not to let learners tackle problems in this section that are too complicated. The practical use of being able to work with time is essentially to be able to work out time differences (on a bus timetable or on a flight itinerary, for example).
- Some examples in the section on measuring time are given with a decimal point. This is because this is usually the way the time will be displayed on a clock or stopwatch. Learners should understand that in South Africa this should be written with a comma like other decimal numbers but that it often is not.
- Another practical application of working with time is time management. Compiling a timetable is a good example of this. This will be invaluable for learners when it comes to working with the school timetable or compiling a study timetable for exams.

Solutions



16.1 Practise calculations with units of time

Learner's Book page 125

1.
 - a. 24 hours in 1 day \therefore number of seconds in 1 day
 60 minutes in 1 hour $= 24 \times 60 \times 60$
 60 seconds in 60 minutes $= 86\,400$ seconds
 - b. 7 days in one week
 \therefore number of seconds in one week $= 7 \times 86\,400$
 $= 604\,800$ seconds
 - c. 365 days in one year
 \therefore number of seconds in a year $= 365 \times 86\,400$
 $= 31\,536\,000$ seconds
 - d. A leap year has 366 days.
 \therefore number of seconds in a leap year $= 366 \times 86\,400$
 $= 31\,622\,400$ seconds
2. Number of leap years in 87 years $= \frac{87}{4} = 21 \text{ rem. } 3$
 Additional hours due to leap years $= 21 \times 24 = 504$
 Total number of hours in 87 years $= 762\,120 + 504 = 762\,624$ hours
3. If we ignore the leap years, there are 90×365 days in 90 years $= 32\,850$
 Mass of porridge $= 32\,850 \times 300 \text{ g} = 9\,855\,000 \text{ g} = 9,855 \text{ t}$
 Including the leap years:
 $\frac{90}{4} \approx 22$ leap years \therefore 22 extra days
 $22 \times 300 \text{ g} = 6\,600 \text{ g} = 6,0 \text{ kg} = 0,0066 \text{ t}$
 $9,855 \text{ t} + 0,0066 \text{ t} = 9,8616 \text{ t}$
4. Number of seconds in 14 hours $= 14 \times 60 \times 60 = 50\,400$
 Number of seconds in 27 minutes $= 27 \times 60 = 1\,620$

$$\begin{array}{r} 50\,400 \\ + 1\,620 \\ \hline 52\,020 \end{array}$$

The total journey takes 52 039 seconds, therefore Mapetla gets to number 52 039 'Mississippi' by the time they get to Upington.

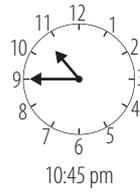
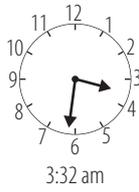


16.2 Practise writing time in different formats

Learner's Book page 127

1.	Time in words	12-hour analogue time	Digital time
	Ten to five in the afternoon	4.50 pm	16:50
	Three thirty-two in the morning	3.32 am	03:32
	A quarter to eleven at night	10.45 pm	22:45
	Twenty past noon	12.20 pm	12:20
	Five minutes to six in the morning	5.55 am	05:55
	Forty minutes to midnight	11.20 pm	23:20
	A quarter to three in the morning	2.45 am	02:45
	Seventeen minutes before eight at night	7.43 pm	19:43

2.



16.3 Practise using date formats

Learner's Book page 129

- 07-06-2001
 - 06-07-2001
- iv
 - vii
 - i
 - ii
 - vi
 - iii
 - viii
 - v

16.4 Practise reading timetables

Learner's Book page 131

- 8
 - You can catch the 06:06; 06:52; 07:45; 09:04; 10:19 or 12:08.
 - You can catch the 04:35; 05:05; 05:43; 06:47; 07:58; 08:51; 10:09 or 11:24.
- 15 buses
 - 18:00
 - No, it doesn't stop.
 - Saturday's timetable is not given.
 - Learners' own answer.

16.5 Practise time conversions

Learner's Book page 134

- $4 \text{ h } 28 \text{ m} = (4 \times 60 + 28) \text{ minutes} = 268 \text{ minutes}$
 - $67 \text{ h } 12 \text{ m } 13 \text{ s}$
 $= (67 \times 60 \times 60) \text{ seconds} + (12 \times 60) \text{ seconds} + 13 \text{ seconds}$
 $= 241\,933 \text{ seconds}$
 - $3 \text{ d } 7,5 \text{ h} = (3 \times 24) \text{ hours} + 7,5 \text{ hours} = 79,5 \text{ hours}$
 - $12,3 \text{ s}$
 - $1:34.56 = 1 \text{ minute and } 34,56 \text{ seconds}$
 $(1 \times 60) + 34,56 = 94,56 \text{ seconds}$
 - $32:52.09 = 32 \times 60 + 52,09 = 1\,972,09 \text{ seconds}$
 - $9:2:14.3 = (9 \times 60 \times 60) + (2 \times 60) + 14,3 = 32\,534,3 \text{ seconds}$
 - $14 \text{ d } 6 \text{ h } 48 \text{ s} = (14 \times 24 \times 60 \times 60) + (6 \times 60 \times 60) + 48$
 $= 1\,231\,248 \text{ seconds}$
- $16 + 31 + 21 = 68 \text{ days}$
- | | |
|-------------------------------------|------------------|
| 15 January 1910 to 28 February 2001 | 91 years 44 days |
| 3 December 1909 to 24 December 2000 | 91 years 21 days |

The grandfather born on 15 January 1910 was the oldest when he died.

4. Runner number	Finish time	Ranking
207	11:12:51	3
443	11:22:16	2
95	12:40:20	4
391	13:33:06	5
140	14:06:04	6
22	12:49:06	1

» **16.6 Practise** compiling timetables

Learner's Book page 137

1. Individual answers will vary.
2. Individual answers will vary.

TERM 2

WORKED ANSWERS TO EXERCISES

Unit 1 Reading financial documents

Learner's Book pages 140–149

Duration: 4½ hours

Teaching tips

- Learners will already have encountered some financial documents and as they get older they will need to be able to interpret an increasing number of them. This is an essential life skill.
- Some of the bills we have featured here will have different layouts or information throughout the country, depending on the local municipality. Try to get examples from your own area.
- Encourage learners to identify the most important information on each document. There are often unnecessary details (such as advertising or pictures).

Solutions

» 1.1 Practise reading household bills

Learner's Book page 144

1. Class discussion
2. a. $62\,604 - 62\,136 = 468$. The calculation is correct.
b. $105,205 \times 0,5811 + 310,192 \times 0,7047 = 61,13 + 218,59 = R279,73$.
The calculation is correct.
3. Learners work in pairs.

» 1.2 Practise understanding information on utility bills

Learner's Book page 145

- | | | |
|-------|-------|------|
| 1. j | 2. e | 3. b |
| 4. i | 5. a | 6. h |
| 7. f | 8. c | 9. k |
| 10. g | 11. d | |

» 1.3 Practise calculations with household bills

Learner's Book page 146

1. a. Rental: Rental is free, so 12% increase will make no difference.
Broadband: $0,065 \times 133,33 = R8,67$ extra
Local calls: $0,035 \times 134,79 = R4,72$ extra
Mobile calls: $0,042 \times 30,52 = R1,28$ less
b. Rental: no change = 0%
Broadband: $\frac{8,67}{413,15} \times 100 = 2,1\%$ increase
Local calls: $\frac{4,72}{187,4} \times 100 = 2,5\%$ increase
Mobile calls: $\frac{1,28}{187,42} \times 100 = 0,7\%$ decrease

2.
 - a. rates, refuse, water and sewerage
 - b. 21/12/2010 to 19/01/2011
 - c. 14/02/2011
 - d. R0,00
 - e. R1 199,62
 - f. Number of 240 ℓ bins
 - g. Kilolitres (kl)
 - h. Water is used by the people living on the property, but refuse and sewerage are both waste that must be removed from the property.
 - i. 37 kl
 - j. This means that over the period that this bill covers, the household used an average of 1,057 kl per day.
 - k. $\frac{290,05 \times 1,14 \text{ VAT}}{30 \text{ days}} = \text{R}11,02 \text{ per day}$
 - l. Total (excl. VAT): $555,63 + 290,05 + 75,44 + 199,41 = 1\ 120,53$

$$\text{Rates: } \frac{555,63}{1\ 120,53} \times 100 = 49,6\%$$

$$\text{Water: } \frac{290,05}{1\ 120,53} \times 100 = 25,9\%$$

$$\text{Refuse: } \frac{75,44}{1\ 120,53} \times 100 = 6,7\%$$

$$\text{Sewerage: } \frac{199,41}{1\ 120,53} \times 100 = 17,8\%$$

3.
 - a. Total utility expenses = 2 746,63

$$\text{Electricity: } \frac{756,85}{2\ 746,63} \times \frac{100}{1} = 27,56\%$$

$$\text{Water, sewage and refuse: } \frac{433,20}{2\ 746,63} \times \frac{100}{1} = 15,77\%$$

$$\text{Telephone (landline): } \frac{615,92}{2\ 746,63} \times \frac{100}{1} = 22,42\%$$

$$\text{Cellphones: } \frac{(327,48 + 295,00)}{2\ 746,63} \times \frac{100}{1} = 22,66\%$$

$$\text{Rates: } \frac{318,18}{2\ 746,63} \times \frac{100}{1} = 11,58\%$$

- b. Total monthly expenditure = R11 954,50 ($\frac{2\ 746,63}{11\ 954,50} \times \frac{100}{1} = 22,98\%$)

$$\text{Electricity: } \frac{756,85}{11\ 954,50} \times \frac{100}{1} = 6,33\%$$

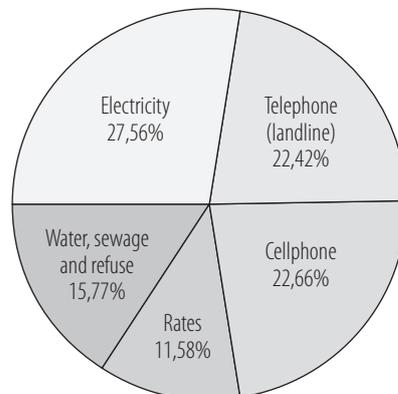
$$\text{Water, sewage and refuse: } \frac{433,20}{11\ 954,50} \times \frac{100}{1} = 3,62\%$$

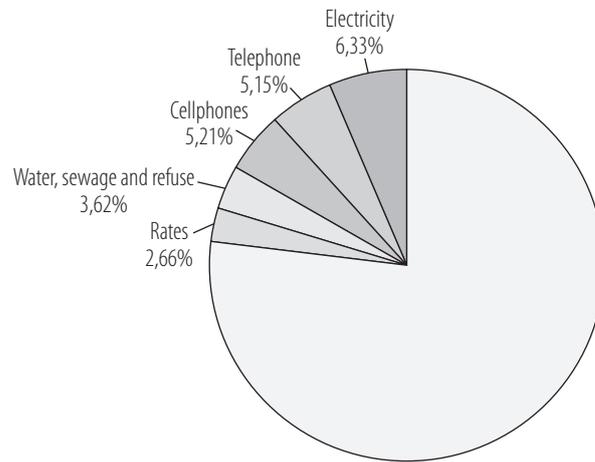
$$\text{Telephone (landline): } \frac{615,92}{11\ 954,50} \times \frac{100}{1} = 5,15\%$$

$$\text{Cellphones: } \frac{(327,48 + 295,00)}{11\ 954,50} \times \frac{100}{1} = 5,21\%$$

$$\text{Rates: } \frac{318,18}{11\ 954,50} \times \frac{100}{1} = 2,66\%$$

- c. Utility expenses as a proportion of total utility expenses





Utility expenses make up 22,98% of total montly expenditure.

d. Each learner to collect own utility bills.

Unit 2 Reading shopping documents

Learner's Book pages 150–158

Duration: 2¼ hours

Teaching tips

- This unit should be meaningful for your learners as it focuses on documents that they have probably already seen, particularly invoices and receipts.
- Once again, ask learners to bring in as many examples of financial documents as they can. This will give the class more practice.
- Emphasise the importance of these documents as records or ‘proof’ of a transaction. They can be of legal importance (for example, for deducting from income tax, or if an appliance breaks while it is still under warranty).
- The difference between an invoice and a statement may need to be clarified. Statements are issued to people or companies that hold accounts. The statement may list several invoices.

Solutions



2.1 Practise reading and writing cash slips

Learner's Book page 154

1. a.	Name	Kroonvaal 1 Stop North	SA National Roads Agency	The Good Stuff	La Cuccina	(No name)
b.	Date	27/05/2011	28/05/2011	26/05/2011	22/05/2011	26/05/2011
c.	Cost before VAT	R14,87	R29,00 (incl. VAT)	R34,50 (no indication regarding VAT)	R143,70 (incl. VAT)	R350,50 (no indication regarding VAT)
d.	VAT added?	R2,08	Not given	Not given	R17,65	Not given
e.	Returns?	Not applicable	Not applicable	No information	Not applicable	Not applicable

- Learners' own work.
- Learners' own work.

» 2.2 Practise reading invoices and account statements

Learner's Book page 157

Invoices and accounts provided by teacher.

» 2.3 Practise checking account statements

Learner's Book page 157

Account statements and invoices provided by teacher.

Unit 3

Comparing tariffs

Learner's Book pages 159–168

Duration: 2¼ hours

Teaching tips

- This unit requires learners to compare and contrast tariffs. Its purpose is similar to that of Unit 11 in Term 1 where they were required to determine the 'best buy'.
- Tariffs are a bit more complicated than ordinary pricing because they are usually 'stepped', which means that the tariff rate changes as consumption increases.
- The skills developed here are important for learners to be able to choose tariffs (for example telephone or cellphone packages) that suit their specific needs. Companies will often try to get consumers to purchase packages that are not suitable.

Solutions

» 3.1 Practise identifying and calculating with tariffs

Learner's Book page 161

- a. Water: kl Electricity: kWh
 - b. Water: 2 kl Electricity: 1 054,92 kWh
 - c. Water: $(6,64 + 0,93) \div 2 = R3,79$ per kl
Electricity: $(800,69 + 112,10) \div 1\ 054,92 = 0,87 = 87c$ per kWh
 - d. Water: $6,64 + 0,93 = R7,57$
Electricity: $800,69 + 112,10 = R912,79$
- a. $4 \times 1,50 = R6,00$
 - b. $4 \times 1,60 = R6,40$
 - c. Off-peak: $10 \times 0,95 = R9,50$
Peak: $6 \times 1,60 = R9,60$
The off-peak call is cheaper.
- a. R14,60
 - b. R471,10
 - c. $\frac{471,10}{44} = R10,71$
 - d. The 10 trip tariff. She could also buy a book of tickets with more trips as this would be cheaper.
 - e. $R16,00 + R11,20 = R27,20$
 - f. $R16,00 - R11,20 = R4,80$
 $\% \text{ discount} = \frac{4,80}{16,00} \times \frac{100}{1} = 30\%$
 - g. $R9,93 + R6,94 = R16,87$
Daily saving = $R27,20 - R16,87 = R10,33$

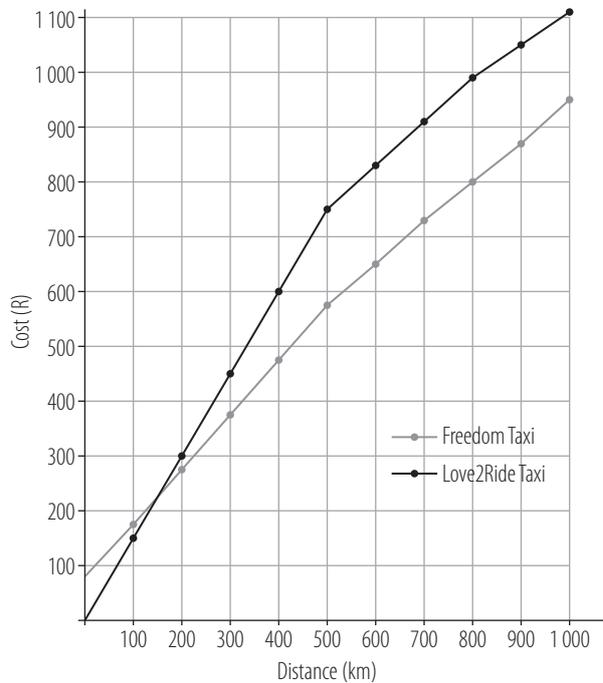


3.2 Practise comparing and choosing tariffs

Learner's Book page 165

1. a. Mr and Mrs Williams should use Option 3. Since Mr Williams makes lots of calls in the afternoon and they have many local friends, the 1 300 free minutes for local and long-distance calls will be the best option.
- b. Zenzile should use Option 2. This option allows her unlimited long-distance calls in the off-peak period.
- c. Since Dr Lupuwana probably won't make many calls (most phone calls will be incoming, to book appointments) he should probably choose Option 1. This has the lowest monthly subscription.

Distance (km)	100	200	300	400	500	600	700	800	900	1 000
Cost: Freedom Taxis (R)	175	275	375	475	575	650	725	800	875	950
Cost: Love2Ride Taxis (R)	150	300	450	600	750	830	910	990	1 050	1 110



- b. i. Freedom Taxis
- ii. Freedom Taxis
- iii. Freedom Taxis



3.3 Practise calculating tariff savings

Learner's Book page 167

1. a. Assuming a 30-day month $R6,58 = 658c$
 $Cost = 1\ 723 \times 79,97 + 30 \times 658$
 $= 157\ 528,31c$
 $= R1\ 575,28$
- b. $Cost = 1\ 390 \times 93,31$
 $= 129\ 700,90c$
 $= R1\ 297,01$
 $R\ 1\ 575,28 - R1\ 297,01 = R278,27$
 \therefore They will save R R278,27.

c. $0-50 = 0$
 $50,1-150 \text{ kWh} = 100 \times 58,11 = 5\,811$
 $150,1-412 \text{ kWh} = 262 \times 70,47 = \frac{18\,463,14}{24\,274,14}$

Cost = R242,74

2. a. Zero tariff
 b. $R13,34 \times 42 \text{ kl} = R560,28$ excl. VAT
 Cost incl. VAT = R638,72
 c. At 78 kl per month, cost = $78 \times 17,20 = R1\,341,60$
 At 58 kl per month, cost = $58 \times 13,34 = R773,72$
 Saving = $R1\,341,60 - R773,72 = R567,88$
 VAT payable on R1 341,60 = R187,82
 VAT payable on R773,72 = R108,32
 Saving = $R187,82 - R108,32 = R79,50$
 d. If a factory uses less than 20 kl of water per month, they are paying more than the domestic tariff.
 If they use more than 20 kl per month, they are paying much less than the domestic tariff.

Unit 4

Measuring length and distance

Learner's Book pages 169–178

Duration: 2¼ hours

Teaching tips

- Measurement of length should not be new for learners. However, it is a good topic to use to remind learners of the importance of estimation. Parts of the body are useful to help estimate lengths.
- It is also important to emphasise accuracy here. Learners will need a ruler, and should be able to use it carefully and accurately. Readings should be taken by looking down at the length being measured from directly above the ruler for maximum accuracy.
- The section on distance introduces learners to the concept of scale for the first time. Be sure to go through this section slowly so that all learners understand why a scale is needed (so that large distances can be represented on much smaller pieces of paper). The concept of scale is also used on the axes of graphs.
- Try to get as many examples of maps as you can to give learners extra practice. You could make use of Google Maps (<http://maps.google.co.za>) to find maps of regions that are of interest to the class.

Solutions



4.1 Practise estimation and accurate measurement of length

Learner's Book page 171

- Learners take their own measurements.
- Learners take their own measurements.
- Learners take their own measurements.
- | | |
|--------------|-------------|
| a. 1 cm | b. 1 mm |
| c. same unit | d. 0,001 mm |
- | | |
|--|---|
| a. $0,18 \text{ m} = 18 \text{ cm}$ | b. $0,32 \text{ m} = 320 \text{ mm}$ |
| c. $20,7 \text{ cm} = 0,207 \text{ m}$ | d. $4,32 \text{ cm} = 43,2 \text{ mm}$ |
| e. $200,34 \text{ cm} = 2\,003,4 \text{ mm}$ | f. $0,0127 \text{ m} = 1,27 \text{ cm}$ |
| g. $0,067 \text{ m} = 67 \text{ mm}$ | h. $3\,419 \text{ mm} = 341,9 \text{ cm}$ |

6. Learners' own work
7. a. $25 \text{ mm} + 12 \text{ cm}$
 $= 25 \text{ mm} + 120 \text{ mm}$
 $= 145 \text{ mm}$
- b. $2 \text{ m} + 2 \text{ cm}$
 $= 2 \text{ m} + 0,02 \text{ m}$
 $= 2,02 \text{ m}$
- c. $0,73 \text{ cm} + 10 \text{ mm}$
 $= 0,73 \text{ cm} + 1 \text{ cm}$
 $= 1,73 \text{ cm}$
- d. $2 \text{ m} + 400 \text{ cm} + 64 \text{ mm}$
 $= 200 \text{ cm} + 400 \text{ cm} + 6,4 \text{ cm}$
 $= 606,4 \text{ cm}$
- e. $0,5 \text{ m} + 10 \text{ cm} + 3 \text{ mm}$
 $= 50 \text{ cm} + 10 \text{ cm} + 0,3 \text{ cm}$
 $= 60,3 \text{ cm}$
- f. $1,2 \text{ m} + 69 \text{ cm} + 40 \text{ mm}$
 $= 1200 \text{ mm} + 690 \text{ mm} + 40 \text{ mm}$
 $= 1930 \text{ mm}$

» 4.2 Practise calculating costs per length

Learner's Book page 173

1. a. $1,2 \text{ m}$ rounds down to 1 m : $1 \times R12,50 = R12,50$
 $1,2 \times R12,50 = R15$
- b. $0,75 \text{ m}$ rounds up to 1 m : $1 \times R12,50 = R12,50$
 $0,75 \times R12,50 = R9,38$
- c. $1 \text{ m } 35 \text{ cm}$ rounds down to 1 m : $1 \times R12,50 = R12,50$
 $1 \text{ m } 35 \text{ cm} = 1,35 \text{ m}$
 $1,35 \times R12,50 = R16,88$
- d. 95 cm rounds up to 1 m : $1 \text{ m} \times R12,50 = R12,50$
 $95 \text{ cm} = 0,95 \text{ m}$
 $0,95 \times R12,50 = R11,88$
2. a. **Estimates**
 $R32,95$ rounds up to $R33$ per metre.
- i. $2 \times 1,45 = 2,9$, which rounds up to 3 m .
 $3 \times R33 = R99$
- ii. $4 (2 \text{ pairs}) \times 2,4 = 9,6$, which rounds up to 10 m .
 $10 \times R33 = R330$
- iii. $2 \times 0,9 = 1,8$, which rounds up to 2 m .
 $2 \times R33 = R66$

Accurate calculations

- i. $2 \times 1,45 = 2,9$
 $2,9 \times R32,95 = R95,56$
- ii. $4 \times 2,4 = 9,6$
 $9,6 \times R32,95 = R316,32$
- iii. $2 \times 0,9 = 1,8$
 $1,8 \times R32,95 = R59,31$
- b. $2,9 \text{ m} + 9,6 \text{ m} + 1,8 \text{ m} = 14,3 \text{ m}$
- c. $14,3 \text{ m} \times R32,95 = R471,19$
- d. Using answers from (a)
 $R95,56 + R316,32 + R59,31 = R471,19$
 Answers are the same
3. a. $7 \text{ m} \times R2,35 = R16,45$
- b. $15 \text{ m} \times R2,35 = R35,25$
 A roll costs $R35,00$
 \therefore a roll would be cheaper.

» 4.3 Practise calculations with distances

Learner's Book page 175

1. a. A return journey would be $2 \times 52,7 \text{ km}$.
 In a day, the bus travels $6 \times 2 \times 52,7 \text{ km} = 632,4 \text{ km}$
- b. Distance travelled in a weekend = $2 \times 8 \times 52,7 = 843,2 \text{ km}$

- c. i. Distance = $5(632,4 \text{ km}) + 843,2 \text{ km} = 4\,005,2 \text{ km}$ per week
 ii. If we work on the fact that there are 52 weeks in a year, distance travelled in 1 year = $52 \times 4\,005,2 = 208\,270 \text{ km}$

2.

Odometer reading before trip	Trip meter reading after trip	Odometer reading after trip
3 278,1	352,8	3 630,9
192 761,7	4 220,3	196 982
9 729,4	724,7	10 454,1
801 099,7	899,8	801 999,5

3. a. Total distance travelled by 5 drivers = $5 \times 16\,540 = 82\,700 \text{ km}$
 Distance that each of the 3 drivers most travel = $\frac{82\,700}{3} = 27,566,67 \text{ km/month}$
- b. i. Each of the 5 drivers earned $R2\,500 + 16\,540 \times R2,25 = R39\,715$
 ii. Each of the 3 drivers will earn $R2\,500 + 27\,566,67 \times R2,25 = R64\,525,01$

» 4.4 Practise using scale bars to estimate and calculate distances

Learner's Book page 177

1. a. 2,5 cm represents 5 km
 2,5 cm represents 500 000 cm
 1 cm represents 200 000 cm
 1 : 200 000
- b. i. $11,9 \text{ cm} \times 200\,000 = 2\,380\,000 \text{ cm} = 23,8 \text{ km}$
 ii. $5,8 \text{ cm} \times 200\,000 = 1\,160\,000 \text{ cm} = 11,6 \text{ km}$
 iii. Unisa is closer.
 iv. Closer to Pretoria West.
- c. None of the answers in b. are accurate because a straight-line distance was measured. This did not take into account the actual route you would need to take.
2. a. 2 cm represents 100 km
 2 cm represents 10 000 000 cm
 1 cm represents 5 000 000 cm (50 km)
 1 : 5 000 000
- b. $2,7 \text{ cm} \times 50 = 135 \text{ km}$
 c. Approximately $3,5 \text{ cm} \times 50 = 175 \text{ km}$
 d. It is shorter (just!).
 e. Maseru–Bloemfontein–Colesburg

Unit 5

Measuring mass

Learner's Book pages 179–189

Duration: 2¼ hours

Teaching tips

- Learners should be familiar with the measurement of mass as they will probably have measured their own body mass or helped in the kitchen with measuring out quantities.

- Notice that throughout this section we talk of mass and not weight. Weight is actually a force (the force of gravity on an object) and is not measured in mass units, such as kg. Confusingly, although instruments like bathroom scales actually do measure weight, they are marked in kilograms. In all work done in this course learners are only expected to deal with mass.
- Notice that there is a difference between a ton and a tonne. In South Africa we use the tonne (= 1 000 kg) although the American spelling ‘ton’ is often mistakenly used. A ton is equivalent to 2 000 pounds, and a tonne (called a long ton in America) is 2 200 pounds.

Solutions

» 5.1 Practise identifying accuracy of mass measuring instruments

Learner's Book page 180

- c. Least accurate
- b.
- a. most accurate

» 5.2 Practise conversions and calculations with mass

Learner's Book page 180

- a. g
 - b. tonnes
 - c. kg
 - d. kg
 - e. g
 - f. g
 - g. g
 - h. tonnes
- a. $4,7 \text{ kg} = 4\,700 \text{ g}$
 - b. $77,45 \text{ kg} = 77\,450 \text{ g}$
 - c. $0,9 \text{ kg} = 900 \text{ g}$
 - d. $5 \text{ t} = 5\,000 \text{ kg}$
 - e. $5\,372 \text{ g} = 5,372 \text{ kg}$
 - f. $65\,472 \text{ g} = 65,472 \text{ kg}$
 - g. $429 \text{ g} = 0,429 \text{ kg}$
 - h. $8 \text{ g} = 8\,000 \text{ mg}$
 - i. $24,7 \text{ mg} = 0,0247 \text{ g}$
 - j. $66 \text{ g} = 0,066 \text{ kg}$
 - k. $12,6 \text{ g} = 0,0126 \text{ kg}$
 - l. $1\,000\,000 \text{ g} = 1 \text{ t}$
- a. $180 \text{ g} \times 4 + 5 \text{ kg}$
 $= 720 \text{ g} + 5 \text{ kg}$
 $= 0,72 \text{ kg} + 5 \text{ kg}$
 $= 5,72 \text{ kg}$
 $\approx 6 \text{ kg}$
 - b. $2,4 \text{ kg} \div 2 + 400 \text{ g} \times 6$
 $= 1,2 \text{ kg} + 2\,400 \text{ g}$
 $= 1,2 \text{ kg} + 2,4 \text{ kg}$
 $= 3,6 \text{ kg}$
 $\approx 4 \text{ kg}$
 - c. $50 \text{ mg} \times 7 + 25 \text{ g} \times 3$
 $= 350 \text{ mg} + 75 \text{ g}$
 $= 0,35 \text{ g} + 75 \text{ g}$
 $= 75,35 \text{ g}$
 $\approx 75 \text{ g}$
 - d. $734 \text{ kg} \times 2 + 2,3 \text{ t} + 9\,050 \text{ g}$
 $= 1\,468 \text{ kg} + 2,3 \text{ t} + 9,050 \text{ kg}$
 $= 1,468 \text{ t} + 2,3 \text{ t} + 0,009\,050 \text{ t}$
 $= 3,777\,05 \text{ t}$
 $\approx 4 \text{ t}$
 - e. $325 \text{ mg} + 330 \text{ g} \times 4 - 0,25 \text{ kg}$
 $= 0,000325 \text{ kg} + 1,320 \text{ kg} - 0,25 \text{ kg}$
 $= 1,070\,325 \text{ kg}$
 $\approx 1 \text{ kg}$
 - f. $60 \text{ kg} - 850 \text{ g} \times 10 + (400 \text{ mg} + 200 \text{ g} \times 0,5)$
 $= 60 \text{ kg} - 8\,500 \text{ g} + (0,4 \text{ g} + 100 \text{ g})$
 $= 60 \text{ kg} - 8,5 \text{ kg} + 100,4 \text{ g}$
 $= 60 \text{ kg} - 8,5 \text{ kg} + 0,1004 \text{ kg}$
 $= 51,6004 \text{ kg}$
 $\approx 52 \text{ kg}$
- a. Learners do their own solutions.
 - b. The total mass of all the people is just over 1 400 kg, so the lift would have to make at least 3 trips.

1. a. Quantities for 4 kebabs

$$\frac{300 \text{ g}}{4} = 75 \text{ g chopped onion}$$

$$\frac{40 \text{ g}}{4} = 10 \text{ g flour}$$

$$\frac{150 \text{ g}}{4} = 37,5 \text{ g chopped tomatoes}$$

$$\frac{10 \text{ g}}{4} = 2,5 \text{ g salt}$$

$$\frac{20 \text{ g}}{4} = 5 \text{ g grated root ginger}$$

$$\frac{60 \text{ g}}{4} = 15 \text{ g peanut butter}$$

$$\frac{10 \text{ g}}{4} = 2,5 \text{ g fresh garlic}$$

$$\frac{4 \text{ tbsp}}{4} = 1 \text{ tbsp peanut oil}$$

b. Quantities for 72 kebabs

$$300 \text{ g} \times 4,5 = 1\,350 \text{ g or } 1,35 \text{ kg chopped onions}$$

$$40 \text{ g} \times 4,5 = 180 \text{ g flour}$$

$$150 \text{ g} \times 4,5 = 675 \text{ g chopped tomatoes}$$

$$10 \text{ g} \times 4,5 = 45 \text{ g salt}$$

$$20 \text{ g} \times 4,5 = 90 \text{ g grated root ginger}$$

$$60 \text{ g} \times 4,5 = 270 \text{ g peanut butter}$$

$$10 \text{ g} \times 4,5 = 45 \text{ g fresh garlic}$$

$$4 \text{ tbsp} \times 4,5 = 18 \text{ tbsp peanut oil}$$

2. a. i. $x : 3 \text{ m}^2 = 4,5 \text{ kg} : 9 \text{ m}^2$

$$\therefore \frac{x}{3} = \frac{4,5}{9}$$

$$\therefore x = \frac{4,5}{9} \times 3$$

$$x = 1,5 \text{ kg}$$

ii. $x : 16 \text{ m}^2 = 4,5 \text{ kg} : 9 \text{ m}^2$

$$\therefore \frac{x}{16} = \frac{4,5}{9}$$

$$\therefore x = \frac{4,5}{9} \times 16$$

$$\therefore x = 8 \text{ kg}$$

iii. $x : 24 \text{ m}^2 = 4,5 \text{ kg} : 9 \text{ m}^2$

$$\therefore x = \frac{4,5}{9} \times 24$$

$$x = 12 \text{ kg}$$

b. fish meal : lime : bone meal : kelp meal = 4 : 1 : $\frac{1}{2}$: 1

i. 1,5 kg fertiliser requires:

$$\frac{4}{6,5} \times 1,5 = 0,92 \text{ kg fish meal}$$

$$\frac{1}{6,5} \times 1,5 = 0,23 \text{ kg lime}$$

$$\frac{\frac{1}{2}}{6,5} \times 1,5 = 0,12 \text{ kg bone meal}$$

$$\frac{1}{6,5} \times 1,5 = 0,23 \text{ kg kelp meal}$$

ii. 8 kg fertiliser requires:

$$\frac{4}{6,5} \times 8 = 4,92 \text{ kg fish meal}$$

$$\frac{1}{6,5} \times 8 = 1,23 \text{ kg lime}$$

$$\frac{\frac{1}{2}}{6,5} \times 8 = 0,62 \text{ kg bone meal}$$

$$\frac{1}{6,5} \times 8 = 1,23 \text{ kg kelp meal}$$

iii. 12 kg fertiliser requires:

$$\frac{4}{6,5} \times 12 = 7,38 \text{ kg fish meal}$$

$$\frac{1}{6,5} \times 12 = 1,85 \text{ kg lime}$$

$$\frac{\frac{1}{2}}{6,5} \times 12 = 0,92 \text{ kg bone meal}$$

$$\frac{1}{6,5} \times 12 = 1,85 \text{ kg kelp meal}$$

c. i. **Fish meal**

$$x : 0,92 \text{ kg} = R22 : 10 \text{ kg}$$

$$\therefore \frac{x}{0,92} = \frac{R22}{10}$$

$$\therefore x = \frac{22}{10} \times 0,92$$

$$x = R2,02$$

Fish meal costs R2,02

Lime

$$x : 0,23 \text{ kg} = R14,50 : 5 \text{ kg}$$

$$\therefore \frac{x}{0,23 \text{ kg}} = \frac{R14,50}{5}$$

$$x = \frac{14,50}{5} \times 0,23$$

$$x = R0,67$$

Lime costs 67c

Bone meal

$$x : 0,12 \text{ kg} = R18,95 : 3 \text{ kg}$$

$$\therefore \frac{x}{0,12} = \frac{18,95}{3}$$

$$\therefore x = \frac{18,95}{3} \times 0,12$$

$$x = R0,76$$

Bone meal costs 76c

Kelp meal

$$x : 0,23 \text{ kg} = R28,95 : 5 \text{ kg}$$

$$\therefore \frac{x}{0,23} = \frac{28,95}{5}$$

$$\therefore x = \frac{28,95}{4} \times 0,23$$

$$x = R1,33$$

Kelp meal costs R1,33

For a 3 m² garden, the total cost of the fertiliser

$$= R2,02 + R0,67 + R0,76 + R1,33 = R4,78$$

ii. **Fish meal**

$$x : 4,92 \text{ kg} = R22 : 10 \text{ kg}$$

$$\therefore \frac{x}{4,92} = \frac{22}{10}$$

$$\therefore x = \frac{22}{10} \times 4,92$$

$$x = R10,82$$

Fish meal costs R10,82

Lime

$$x : 1,23 \text{ kg} = R14,50 : 5 \text{ kg}$$

$$\frac{x}{1,23} = \frac{14,50}{5}$$

$$\therefore x = \frac{14,50}{5} \times 1,23$$

$$x = R3,57$$

Lime costs R3,57

Bone meal

$$x : 0,62 \text{ kg} = R18,95 = R18,95 : 3 \text{ kg}$$

$$\frac{x}{0,62} = \frac{18,95}{3}$$

$$\therefore x = \frac{18,95}{3} \times 0,62$$

$$\therefore x = R3,92$$

Bone meal costs R3,92

Kelp meal

$$x : 1,23 \text{ kg} = R28,95 : 5 \text{ kg}$$

$$\frac{x}{1,23} = \frac{28,95}{5}$$

$$\therefore x = \frac{28,95}{5} \times 1,23$$

$$x = R7,12$$

Kelp meal costs R7,12

For a 16 m² garden, the total cost of the fertiliser

$$= R10,82 + R3,57 + R3,92 + R7,12$$

$$= R25,43$$

iii. For a 24 m² garden, we can use ratio to calculate the cost.

$$Rx : 24 \text{ m}^2 = R4,78 : 3 \text{ m}^2$$

$$\therefore \frac{x}{24} = \frac{4,78}{3}$$

$$\therefore x = \frac{4,78}{3} \times 24$$

$$x = R38,24$$

3. a. Piece 1

$$Rx : 1 \text{ kg} = R23,10 : 481 \text{ g}$$

$$\therefore Rx : 1 \text{ kg} = R23,10 : 0,481 \text{ kg}$$

$$\therefore \frac{x}{1} = \frac{23,10}{0,481}$$

$$x = R48,02$$

Piece 1 costs R48,02/kg

Piece 2

$$Rx : 1 \text{ kg} = R17,85 : 304 \text{ g}$$

$$\therefore Rx : 1 \text{ kg} = R17,85 : 0,304 \text{ kg}$$

$$\frac{x}{1} = \frac{17,85}{0,304}$$

$$\therefore x = R58,72$$

Piece 2 costs R58,72/kg

b. Piece 3

$$x \text{ kg} : R32,50 = 1 \text{ kg} : R42,50$$

$$\therefore \frac{x}{32,50} = \frac{1}{42,50}$$

$$\therefore x = \frac{1}{42,50} \times 32,50$$

$$x = 0,765 \text{ kg}$$

Piece 3 is 765 g.

Piece 4

$$x \text{ kg} : R29,85 = 1 \text{ kg} : R61,20$$

$$\therefore \frac{x}{29,85} = \frac{1}{61,20}$$

$$\therefore x = \frac{1}{61,20} \times 29,85$$

$$x = 0,488 \text{ kg}$$

Piece 4 is 488 g

c. Piece 3 at R42,50/kg is the cheapest and therefore the best value for money.

4. Potato topping: 40% × 450 g = 180 g

Vegetarian mince: 20% × 450 g = 90 g

Gravy: 12% × 450 g = 54 g

Lentils: $10\% \times 450 \text{ g} = 45 \text{ g}$

Onion: $8\% \times 450 \text{ g} = 36 \text{ g}$

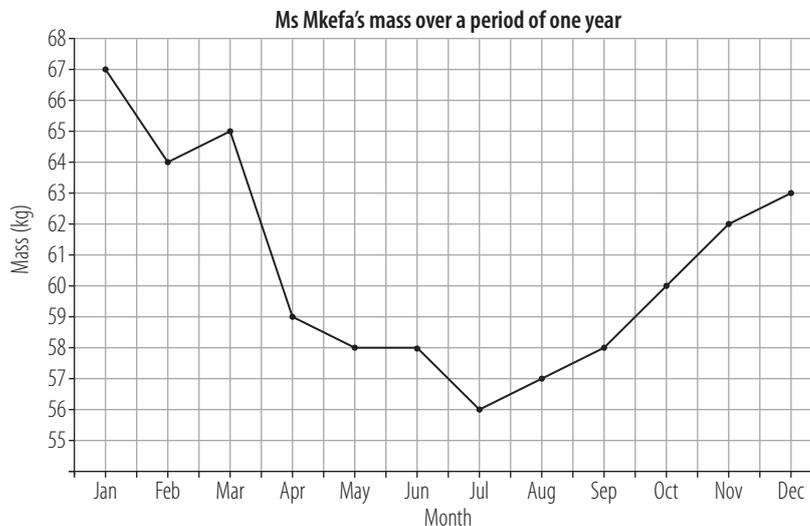
Peas: $5\% \times 450 \text{ g} = 22,5 \text{ g}$

Carrots: 22,5 g

» 5.4 Practise keeping records of body mass

Learner's Book page 189

1. a.



b. When Mrs Mkefa had 'flu and broke her wrist, she was probably not eating properly and she could not cook very well with her broken wrist.

2. Learners' own work

Unit 6 Measuring volume

Learner's Book pages 190–196

Duration: 2½ hours

Teaching tips

- Learners often find converting between volume units difficult. Refer them to the conversion table in this unit as well as that in Unit 15 of Term 1.
- Be sure to clarify the difference between volume and capacity. Although both can be measured in the same units, volume generally refers to the amount of space a shape occupies and capacity generally refers to the amount of space inside an object.
- Volume is frequently used in cooking and in making mixtures. Try to provide as many everyday examples for learners as you can.

Solutions

» 6.1 Practise working with units of volume

Learner's Book page 192

1. a. i. 12 ml

ii. $2\frac{1}{2}$ tsp

b. i. $x : 5 = 75 \text{ ml} : 4$

ii. $x : 5 = 6 : 4$

$$\therefore x = \frac{75}{4} \times 5$$

$$\therefore x = \frac{6}{4} \times 5$$

$$x = 93,75 \text{ ml}$$

$$x = 7,5 \text{ tbsp}$$

$$5 \text{ tbsp} = 93,75 \text{ ml}$$

c. i. 400 ml

ii. 2C

2. a. $x : 1\ 000\ \text{ml} = 15 : 200\ \text{ml}$
 $\therefore \frac{x}{1\ 000} = \frac{15}{200}$
 $\therefore x = \frac{15}{200} \times 10\ 000$
 $x = 75\ \text{ml}$
- b. For lawns $15\ \text{ml} : 200\ \text{ml}$
 For flower beds ($\frac{2}{3} \times 15 = 10\ \text{ml}$)
 $10 : 200\ \text{ml}$
 $x : 5\ 000 = 10 : 200$
 $\therefore \frac{x}{5\ 000} = \frac{10}{200}$
 $\therefore x = \frac{10}{200} \times \frac{5\ 000}{1}$
 $= 250\ \text{ml}$
- c. i. $\frac{15}{200} \times \frac{100}{1} = 7,5\%$
 ii. $\frac{10}{200} \times \frac{100}{1} = 5\%$
- d. $50 : x = 15 : 200$
 $\therefore \frac{50}{x} = \frac{15}{200}$
 $\therefore 50 \times \frac{200}{15} = x$
 $= 666,67\ \text{ml water}$
- e. $10 : 200 = 50 : x$
 $\frac{10}{200} = \frac{50}{x}$
 $\therefore x = 50 \times \frac{200}{10}$
 $= 1\ 000\ \text{ml}$
 Extra water which must be added = $1\ 000 - 666,67 = 333,33\ \text{ml}$



6.3 Practice cost and volume calculations

Learner's Book page 195

1. a. $\frac{R6,95}{0,5} = R13,90/\ell$ (500 ml can)
 $R9,95/\ell$ (1 ℓ bottle)
 $\frac{R13,95}{1,5} = R9,30/\ell$ (1,5 ℓ bottle)
 $\frac{R17,95}{2} = R8,98/\ell$ (2 ℓ bottle)
 The 500 ml can costs the most and the 2 ℓ bottle costs the least.
- b. Difference = $R13,90 - R8,98 = R4,92$
- c. The 500 ml can is a good buy if one person wants a drink.
 The 2 ℓ would be a good buy for a family or a group of people.
2. a. **Honey**
 $\frac{R27,50}{300} = \frac{R27,50}{0,3} = R91,67/\ell$
 $\frac{R45,00}{0,5} = R90,00/\ell$
 $R70,00/\ell$
 The honey selling for $R70,00/\ell$ is the best option.
- Full cream milk**
 $R9,95/\ell$
 $R5,50/0,5\ \ell = R11,00/\ell$
 Best option is the milk selling for $R9,95/\ell$.

Olive oil

$$\frac{R47,00}{0,45 \ell} = R104,44/\ell$$

$$R80,00/\ell$$

$$\frac{R250,00}{5} = R50,00/\ell$$

The 5 ℓ bottle is the best buy.

Lemonade

$$\frac{R12,00}{0,25 \ell} = R48,00/\ell$$

$$\frac{R23,50}{0,45 \ell} = R52,22 \ell$$

$$R40,00/\ell$$

The 1 ℓ container is the best buy.

- b. Quantity of each product that you need; if you would like to support the organic produce market; if you prefer products that are organically produced.

Unit 7 Measuring temperature

Learner's Book pages 197–201

Duration: 2 hours

Teaching tips

- Though learners will probably rarely have dealt with temperatures in Fahrenheit, the skills required to convert between the two temperatures are important.
- One of the practical applications of measuring temperature is the measurement of body temperature. Our body temperature is an important indicator of our health. If you can, try to obtain a clinical thermometer so that learners can practise taking their temperature. **WARNING:** Clinical thermometers often contain mercury, which is *highly poisonous*. Take the necessary precautions.

Solutions

» 7.1 Practise converting temperatures

Learner's Book page 198

1. $^{\circ}\text{C} = (^{\circ}\text{F} - 32) \div 1,8$

a. $x = (320 - 32) \div 1,8$
 $= 160^{\circ}\text{C}$

c. $x = (125 - 32) \div 1,8$
 $= 51,7^{\circ}\text{C}$

e. $x = (325 - 32) \div 1,8$
 $= 162,8^{\circ}\text{C}$

b. $x = (400 - 32) \div 1,8$
 $= 204,4^{\circ}\text{C}$

d. $x = (200 - 32) \div 1,8$
 $= 93,3^{\circ}\text{C}$

f. $x = (500 - 32) \div 1,8$
 $= 260^{\circ}\text{C}$

2. $^{\circ}\text{F} = (1,8 \times ^{\circ}\text{C}) + 32$

a. $x = (1,8 \times 220) + 32$
 $= 428^{\circ}\text{F}$

c. $x = (1,8 \times 170) + 32$
 $= 338^{\circ}\text{F}$

e. $x = (1,8 \times 95) + 32$
 $= 203^{\circ}\text{F}$

b. $x = (1,8 \times 180) + 32$
 $= 356^{\circ}\text{F}$

d. $x = (1,8 \times 212) + 32$
 $= 413,6^{\circ}\text{F}$

f. $x = (1,8 \times 120) + 32$
 $= 248^{\circ}\text{F}$

3. a.
- | °F | °C |
|-----|-------|
| 180 | 82,2 |
| 300 | 148,9 |
| 350 | 176,7 |
| 400 | 204,4 |
| 450 | 232,2 |
| 500 | 260 |
- b.
- | °C rounded to the nearest 10 °C |
|---------------------------------|
| 80 |
| 150 |
| 180 |
| 200 |
| 230 |
| 260 |
4. a. 48 °F
 b. 32 °C
 c. 113 °F
 d. 37 °C
 e. 195 °F
 f. 32 °F

7.2 Practise analysing body temperatures

Learner's Book page 200

1. a.
- | | Body temperature | |
|----------|------------------|------|
| | °F | °C |
| Elephant | 97,7 | 36,5 |
| Human | 98,6 | 37,0 |
| Whale | 98,6 | 37,0 |
| Bat | 98,6 | 37,0 |
| Horse | 100,4 | 38,0 |
| Seal | 100,4 | 38,0 |
| Baboon | 100,6 | 38,1 |
| Rabbit | 100,9 | 38,3 |
| Cow | 101,5 | 38,6 |
| Dog | 102,0 | 38,9 |
| Cat | 102,2 | 39,0 |
| Goat | 103,1 | 39,5 |
- b. Closer to a goat
 c. $100,4\text{ °F} - 97,7\text{ °F} = 2,7\text{ °F}$
 d. i. Warmest: goat
 ii. Coolest: elephant
 e. 3 °C or 5,4 °F
2. a. Horses, seals, baboons, rabbits, cows, dogs, cats and goats have normal body temperatures that fall into the abnormal human temperature zones.
 b. Class discussion

Unit 8 Working with maps

Learner's Book pages 202–207

Duration: 4½ hours

Teaching tips

- In this unit learners are required to interpret and estimate distances using map scales. Learners often find the concept of scale difficult. It will help if you use real examples of maps that learners can relate to. For example, they could describe the route they take to get to school or from their house to the nearest post office.
- It is essential that learners have a ruler for this unit.
- Take the opportunity to broaden your lesson when talking about maps to discuss topical issues such as service delivery (roads, schools, hospitals etc. in your area).

Solutions



8.1 Practise using the scale line

Learner's Book page 205

1. 3 cm : 3 km
2. 2,4 cm on map: $2,4 : x = 3 : 3$
 $\therefore \frac{2,4}{x} = \frac{3}{3}$
 $x = \frac{2,4 \times 3}{3}$
 $x = 2,4 \text{ km}$
3. 3,2 cm on map: $3,2 : x = 3 : 3$
 $\therefore \frac{3,2}{x} = \frac{3}{3}$
 $x = \frac{3,2 \times 3}{3}$
 $x = 3,2 \text{ km}$
4. More than a km
5. Camp C to the bat cave



8.2 Practise calculating with scale

Learner's Book page 205

- | | | | |
|----|---|----|--|
| a. | $1 : 100 = 1 \text{ mm} : 10 \text{ cm}$ | b. | $1 : 100 = 1 \text{ cm} : 1 \text{ m}$ |
| c. | $1 : 1\,000 = 1 \text{ mm} : 1 \text{ m}$ | d. | $1 : 1\,000 = 1 \text{ cm} : 10 \text{ m}$ |
| e. | $1 : 100 = 1 \text{ cm} : 1 \text{ m}$ | f. | $1 : 1\,000 = 1 \text{ mm} : 1 \text{ m}$ |
- | | | | |
|----|-------------------------|----|------------------------------|
| a. | 1 : 100 | b. | 1 : 3 000 |
| c. | 1 : 15 000 | d. | 1 : 50 000 |
| e. | 2 : 1 000 or 1 : 500 | f. | 5 : 10 000 = 1 : 2 000 |
| g. | 5 : 1 500
or 1 : 300 | h. | 4 : 100 000
or 1 : 25 000 |
- | | | | | | | | |
|----|--------|----|------|----|------|----|--------|
| a. | 5 m | b. | 10 m | c. | 25 m | d. | 12,5 m |
| e. | 22,5 m | f. | 6 m | g. | 21 m | h. | 24 m |
- | | | | | | |
|----|-------|----|--------|----|---------|
| a. | 5 mm | b. | 15 mm | c. | 32,5 mm |
| d. | 25 mm | e. | 125 mm | f. | 97 mm |
- | | | | | | | | |
|----|-------|----|-------|----|-------|----|-------|
| a. | 360 m | b. | 840 m | c. | 168 m | d. | 288 m |
|----|-------|----|-------|----|-------|----|-------|
- | | | | | | | | |
|----|---------|----|---------|----|-------|----|--------------------------|
| a. | 12,5 mm | b. | 27,5 mm | c. | 10 cm | d. | 15,25 mm |
| e. | 5,6 mm | f. | 6,4 cm | | | | $\approx 1,5 \text{ cm}$ |



8.3 Practise working with real distances on a map

Learner's Book page 206

- 1 cm represents 150 km
1 cm represents 15 000 000 cm
- 2–4. Learners' answers will depend on which province your school is in.

Unit 9

Making sense of maps

Learner's Book pages 208–220

Duration: 4½ hours

Teaching tips

- Compared with the previous unit, this unit requires learners to actually interpret maps and describe the information that they convey.
- Again, it will be useful to refer to examples that your learners are familiar with. For example, learners could sketch a map of the route to the nearest bus stop and then describe the route to a partner.
- The section on describing seat positions is very similar to giving the coordinates of a point on a set of axes. This is good practice for graphing.

Solutions



9.1 Practise describing position of a map

Learner's Book page 209

- a. On the left as you come in at the Wares Road entrance.
 - b. On the right as you come in at the Wares Road entrance.
 - c. Behind the Pyott field near the corner of Wares and McLean Roads.
 - d. On the right of the Rectory Astro near the corner of McLean Road and College Drive.
 - e. In the Rectory Astro between Pollock Field and the swimming pool.
 - f. Next to the junior tennis courts and Martin Field, alongside Salisbury Avenue.
- a. The Rectory Astro
 - b. The school tennis courts
 - c. Garages
 - d. A fountain or pond perhaps
 - e. The Pyott field and cricket nets



9.2 Practise working with directions on a map

Learner's Book page 210

1. The pavilion
- a. Walk through the McLean Road entrance and continue with Phillip Field on your right and then turn right and the school shop is straight ahead.
 - b. As you come in at the McLean Road entrance, Gordon Field is on your left. Turn left just after Gordon Field and walk down past the Rectory. Turn right and walk between the boarding house (on your right) and the Pavilion (on your left). Pollock field will be on your left.



9.6 Practise using seat numbers in large venues

Learner's Book page 217

- A to DD
 - 30 rows
 - 164 to 201
 - 38 seats
- Block WU41 row BB; seat number 83. She is sitting in the middle of the third row from the back.
 - WU A80
- Cheapest seats will be in the north block as when you sit at this end, you are only able to get a good view of the game when they are up near the goals. Block S would be where the boxes are, hence the higher seat prices.
 - Block 31 and 38: $33 \text{ rows} \times 33 \text{ seats} = 1\,089 \times 2 = 2\,178 \text{ seats}$
Blocks 32 to 37: $33 \text{ rows} \times 30 \text{ seats} = 990 \times 6 = 5\,940 \text{ seats}$
Total number of seats = $2\,178 + 5\,940 = 8\,118$
 - $8\,118 \times R100 = R811\,800$
 - $\frac{25}{100} \times R811\,800 = R202\,950$



9.7 Practise finding your way around a large venue

Learner's Book page 217

- Gate 9
 - Gate 7
 - Gate 17
 - Gate 11
 - Gate 15
- Walk around the stadium until you are directly opposite to where you are now.
- The tunnel in line with the main entrance
- The seats in the north and south blocks
- The seats in the north block



9.8 Practise using a map of a shopping centre

Learner's Book page 218

- 3 floors
- 5 on the ground floor, 5 on the first floor and 2 on the second floor
= 12 entrances
- On the plan, from left to right, the ground and first floor is divided into three and labelled alphabetically, starting with Zone A on the ground floor. The second floor has only one zone.
- Debenhams and Harvey Nichols
- Ski Dubai, Carrefour and Centrepoint
- Walk between Harvey Nichols and Debenhams and turn left. Walk all the way to the end and turn right. The East Food Court will be on the left before you get to the lifts.
 - Take the nearest escalator to the first floor. At the top of the escalator turn left and walk to the far corner. The last shop on the right is Jumbo Electronics.
 - Walk straight out of Jumbo Electronics all the way to the other end of the mall.
- He will enter in Zone F on the first floor.
 - Mario must turn right when he enters the mall and walk all the way to the end of the mall. The entrance to the toy store will be on his left just before the end.

Unit 10

Expressions of probability

Learner's Book pages 221–234

Duration: 9 hours

Teaching tips

- Since this will be an introduction to probability for learners, move slowly from the language of probability to the maths of probability.
- Try as far as possible to have learners perform experiments themselves to determine probability using relative frequency. This will help them to see that theoretical (expected) probability is often different to that obtained by experiment.
- Two-way tables and tree diagrams are useful ways of tracking possible outcomes for more than one event. Give learners as many different situations as possible where they can practise using these tools to help them.

Solutions

» 10.1 Practise describing probability

Learner's Book page 221

1. Certain
2. Very unlikely
3. Unlikely
4. Very unlikely
5. Certain
6. Unlikely
7. Impossible
8. Impossible

» 10.2 Practise expressing probability in numbers

Learner's Book page 223

1. a. $\frac{1}{2} = 50\%$
- b. $0 = 0\%$
- c. $0 = 0\%$
- d. $\frac{1}{2} = 50\%$
- e. $\frac{3}{6} = \frac{1}{2} = 50\%$
- f. $\frac{2}{6} = \frac{1}{3} = 33,3\%$

» 10.3 Practise working with probability

Learner's Book page 223

1. They are giving the probability that an event will occur. 100% chance of rain means it will “definitely” rain. However, weather forecasts are not always accurate.
2. Learners' own work
3. a. Limpopo
- b. 30% chance of rain means a small probability of rain – a less than 50-50 probability.

» 10.4 Practice investigating outcomes with coins

Learner's Book page 224

Learners' own investigations.

» 10.5 Practise investigating outcomes with a dice

Learner's Book page 224

Getting a 6 is not more difficult than any other number. You have an equal chance of throwing any number.

» 10.6 Practise calculating relative frequency

Learner's Book page 226

1.
 - a. 60 times
 - b. Probability of throwing a 1: $\frac{8}{60} = \frac{2}{15}$
Probability of throwing a 2: $\frac{12}{60} = \frac{1}{5}$
Probability of throwing a 3: $\frac{9}{60} = \frac{3}{20}$
Probability of throwing a 4: $\frac{7}{60}$
Probability of throwing a 5: $\frac{10}{60} = \frac{1}{6}$
Probability of throwing a 6: $\frac{14}{60} = \frac{7}{30}$
 - c. $\frac{(12 + 7 + 14)}{60} = \frac{33}{60} = \frac{11}{20}$
 - d. $\frac{(8 + 12 + 9)}{69} = \frac{29}{60}$
2. a.–d. Learners' own work.

» 10.7 Practise deciding whether outcomes are equally likely or not

Learner's Book page 227

1.
 - a.
 - i. A head or a tail
 - ii. The outcomes are equally likely – there is an equal chance of either outcome occurring.
 - b.
 - i. 1, 2, 3, 4, 5 or 6
 - ii. The outcomes are equally likely – there is an equal chance of any of the outcomes occurring.
 - c.
 - i. The possible outcomes would be the five names.
 - ii. The outcomes are equally likely – there is an equal chance of any of the outcomes occurring.
 - d.
 - i. The possible outcomes are A, B, C, D, E and F.
 - ii. Same as c(ii)
 - e.
 - i. A particular learner has been selected and as this is not a random event, this is the only outcome.
 - ii. This outcome is *not* equally likely as a specific learner has been selected.
 - f.
 - i. The matchbox could land on any one of its six sides.
 - ii. The outcomes are not equally likely as the sides of the matchbox are not the same size or weight.
 - g.
 - i. The choice of headboy is not a random event – a specific learner from the group of prefects will be chosen.
 - ii. This outcome is *not* equally likely as a specific learner has been selected from the group of prefects.
 - h.
 - i. The possible outcomes are a R1 or a R2 coin.
 - ii. The outcomes are not equally likely as there are more R2 coins than R1 coins. The probability of drawing a R2 coin is much higher than the probability of drawing a R1 coin.

» 10.8 Practise working with theoretical probability

Learner's Book page 228

1.
 - a. $P(8) = 0$
 - b. $P(\text{odd number}) = \frac{3}{6} = \frac{1}{2}$
 - c. $P(\text{prime number}) = \frac{3}{6} = \frac{1}{2}$
 - d. $P(\text{number 1 to 6}) = 1$

2. a. $P(\text{multiple of } 6) = \frac{3}{20}$
 b. $P(\text{number} < 13) = \frac{12}{20} = \frac{3}{5}$
 c. $P(26) = 0$
3. a. Busi was correct.
 b. In an example like tossing a coin, the probability of getting a head or a tail is equal, but the order in which this happens is random.
4. a. $P(2) = \frac{1}{2}$ b. $P(2) = \frac{1}{4}$ c. $P(2) = \frac{2}{3}$
 d. $P(2) = \frac{3}{8}$ e. $P(2) = 0$ f. $P(2) = 1$
5. a. $P(5) = \frac{1}{10}$
 b. $P(\text{number} > 7) = \frac{2}{10} = \frac{1}{5}$
 c. $P(\text{even number}) = \frac{4}{10} = \frac{2}{5}$
 d. $P(\text{number} < 15) = 1$
 e. $P(\text{a negative number}) = 0$
 f. $P(\text{multiple of } 3) = \frac{3}{10}$
6. a. Relative frequency of 1 = $\frac{32}{200} = \frac{4}{25}$
 Relative frequency of 2 = $\frac{46}{200} = \frac{23}{100}$
 Relative frequency of 3 = $\frac{30}{200} = \frac{3}{20}$
 Relative frequency of 4 = $\frac{34}{200} = \frac{17}{100}$
 Relative frequency of 5 = $\frac{30}{200} = \frac{3}{20}$
 Relative frequency of 6 = $\frac{28}{200} = \frac{7}{50}$
 b. The fact that the relative frequency of 2 is so much higher than the other numbers would suggest that the die could be biased but not necessarily. It could just be a random chance that the results are so skewed.
7. a. $\frac{1}{3}$ She could throw a 2 or a 5
 b. $\frac{1}{6}$
 c. 0 If a 5 is thrown, the player must move back 3 spaces and will end up on block 2
 d. $\frac{1}{6}$

» 10.9 Practise using two-way tables to represent probability

Learner's Book page 232

1. a. $P(7) = \frac{6}{36} = \frac{1}{6}$
 $\frac{1}{6} \times 100 = 16,67\% \approx 17\%$
 b. $P(11) = \frac{2}{36} = \frac{1}{18}$
 $\frac{1}{18} \times 100 = 5,56\% \approx 6\%$
 c. $P(< 6) = \frac{10}{36} = \frac{5}{18}$
 $\frac{5}{18} \times 100 = 27,78\% \approx 28\%$

2.

	1	2	3	4	5	6
H	H; 1	H; 2	H; 3	H; 4	H; 5	H; 6
T	T; 1	T; 2	T; 3	T; 4	T; 5	T; 6

3. a.

		Number on first spin				
		1	2	3	4	5
Number on second spin	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. i. $P(7) = \frac{4}{25} = 16\%$
 ii. $P(\geq 5) = \frac{19}{25} = 76\%$
 iii. $P(12) = 0 = 0\%$

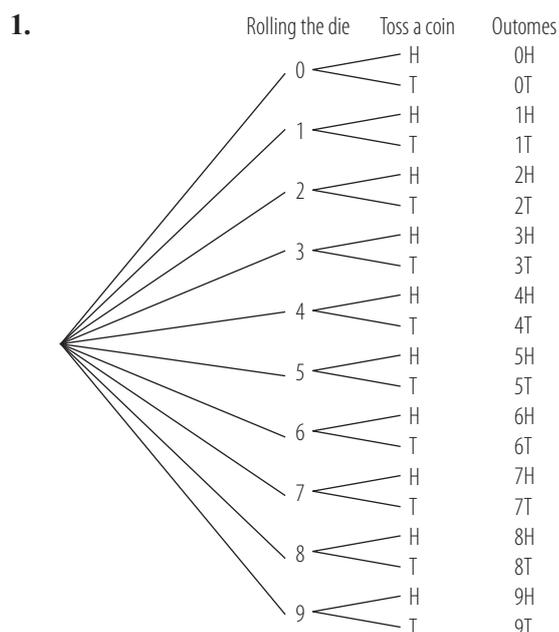
4. a.

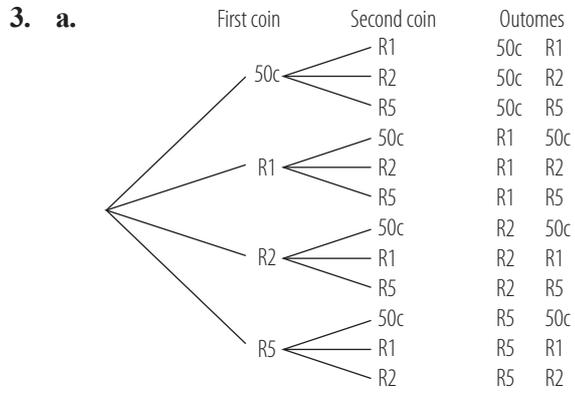
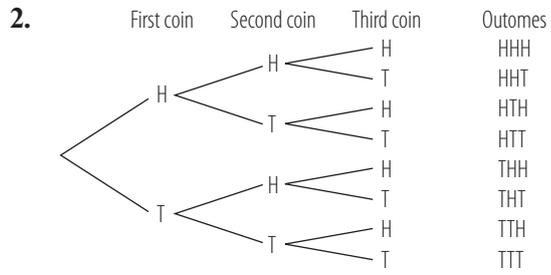
		Petrus' dice					
		2	4	6	8	10	12
Amanda's dice	1	3	5	7	9	11	13
	3	5	7	9	11	13	15
	5	7	9	11	13	15	17
	7	9	11	13	15	17	19
	9	11	13	15	17	19	21
	11	13	15	17	19	21	23

- b. $P(6) = 0 = 0\%$
 c. $P(< 7) = \frac{3}{36} = \frac{1}{12} \approx 8\%$
 d. $P(\text{odd number}) = 1 = 100\%$
5. Using the two-way table on p 231:
- a. $P(\text{Farieda winning})$ or $P(9) = \frac{4}{36} = \frac{1}{9} \approx 11\%$
 b. $P(\text{Hanifa winning})$ or $P(7) = \frac{6}{36} = \frac{1}{6} \approx 17\%$
 c. Hanifa is most likely to win as the probability of her getting a score of 7 is greater than the probability of Farieda getting a score of 9.

» 10.10 Practise using tree diagrams to represent probabilities

Learner's Book page 234





b. 12

TERM 3

WORKED ANSWERS TO EXERCISES

Unit 1

Income and expenditure statements

Learner's Book pages 236–242

Duration: 4½ hours

Teaching tips

- As learners get older and begin to earn their own money they will need skills that enable them to manage their finances. Completing income and expenditure statements and drawing up a budget is an essential part of this.
- Explain to learners that these principles of financial management not only apply to personal finances, they are an essential part of any business too.
- The names given to different types of expenses and income should not be applied too strictly – there is some overlap. For example, a dentist's bill could be either a variable or an occasional expense. The given terms should be used as guidelines only.

Solutions



1.1 Practise working with income and expenditure statements

Learner's Book page 240

- a. Babysitting, student bursary
 - b. Rent, loan repayment and college fees
 - c. Electricity, food, cosmetics and toiletries, cellphone contract and trains and taxis
 - d. Birthday presents, student loan, bookshop work and sale of old computer
 - e. None
 - f. Books and stationery, presents, movies and concerts, dentist, store accounts and return air ticket home
2. $R541,84 \times 12 = R6\,502,08$
The annual total for food is less than the amount for May times 12.
Reasons for this could be that she goes home for the holidays and during this time she would not need to buy her own food; price increases, etc.
3. Her total expenditure for the year (R48 343,00) was more than 12 times the May amount ($R2\,907,88 \times 12 = R34\,894,56$). She would have had additional expenses such as the dentist and the purchase of air tickets during other months.
4. She could have used a credit card to cover her expenses. If she keeps using this method she could find herself in serious debt with no way to repay the money she owes.
5. She could put money aside in a savings account in the months when she has some to spare.
6. Learners' own work



1.2 Practise calculating changes in income and expenditure statements

Learner's Book page 241

1.
 - a. Fees in 2011: R144 000
Fees in 2012: $R144\ 000 + 7,2\% = R144\ 000 + R10\ 368 = R154\ 368$
 - b. Interest in 2011: R41 280
Interest in 2012: $R41\ 280 - 1,25\% = R41\ 280 - R516 = R40\ 764$
 - c. Electricity in 2011: R9 396
Electricity in 2012: $R9\ 396 - 27\% = R9\ 396 - R2\ 536,92 = R6\ 859,08$
 - d. House repairs: $R7\ 500 + (R6\ 488 + 14\%) = R7\ 500 + R7\ 396,32 = R14\ 896,32$
2.
 - a. The family will lose R21 382 per month in income.
 - b. Mrs Mboya would receive no income for 8 months.
 $8 \times R21\ 382$
Reduction in annual income = R171 056
No, they will not have enough money to cover their expenses for the year.
3. Their monthly expenditure will increase as a result of the loan repayment:
 $R40\ 000 \times 8,35\% \text{ p.a.} = R3\ 340 \text{ interest p.a.} \times 4 = R13\ 360 \text{ interest for 4 years.}$
Total amount payable for over 4 years
 $= (R40\ 000 + R13\ 360) \div 48 \text{ months} = R1\ 111,67 \text{ per month.}$
4.
 - a. They will be a bit better off:
 $R15\ 860 \times 6\% = R951,60$
They can add $(R951,60 \times 3) + (R14\ 000 \times 3\%) = R3\ 274,80$ to their income.
 - b. They will end up with a debit balance.
Changes in income in 2012:
 $(R508\ 904,00 - R171\ 056,00) + (R40\ 000 + R3\ 274,80) = R381\ 122,80$
Changes in expenditure in 2012:
 $(R456\ 320,00 + R10\ 368 + R14\ 896,32 + R1\ 111,67) - (R516,00 + R2\ 536,92) = R479\ 643,07$
 $\therefore \text{Balance} = R381\ 122,80 - R479\ 643,07 = -R98\ 520,27$

Unit 2

Preparing a budget

Learner's Book pages 243–249

Duration: 9 hours

Teaching tips

- You could give learners practice in drawing up budgets by asking them to draw up the budget for a school activity such as an outing or a sports day. It is important that learners see drawing up a budget as being relevant to their own lives.

Solutions



2.1 Practise preparing a budget

Learner's Book page 246

Learners' own work



2.2 Practise making changes to budgets

Learner's Book page 248

1. Item	Unit cost	Quantity needed for 6	a. Total cost before discount	b. Total cost after discount
Ex. book	R6,50	12 × 6	R468,00	R444,60
Graph paper	R24,00	1 × 6	R144,00	R144,00 (no discount)
A4 pads	R15,90	6 × 6	R572,40	R543,78
Glue	R13,95	6 × 6	R502,20	R477,09
Pl. pock.	R25,50	4 × 6	R612,00	R581,40
F. folders	R18,95	6 × 6	R682,20	R648,09
Pens (blue)	R8,20	8 × 6	R393,60	R373,92
Pens (red)	R4,60	2 × 6	R55,20	R52,44
Pencils (HB)	R7,25	4 × 6	R174,00	R165,30
Erasers	R2,35	2 × 6	R28,20	R26,79
Rulers	R7,30	1 × 6	R43,80	R43,80 (no discount)
Total			R3 675,60	R3 501,21

c. Total cost with discount = R3 501,21

d. Cost to Darren = R3 501,21 ÷ 6 = R583,54

e. No, there will still be a shortfall of R3,54.

2. Learners' own work

3. a.	2011 Expenditure		2012	
	House loan interest repayment	12 × 3 440 =	R41 280,00	R44 995,20
	Car hire purchase instalments	12 × 2 950 = (not a variable cost)	R35 400,00	R35 400,00
	Electricity		R9 396,00	R10 241,64
	Household insurance	12 × 880 =	R10 560,00	R11 510,40
	Food		R72 000,00	R78 480,00
	Petrol, car repairs		R24 956,00	R27 202,04
	Public transport		R6 260,00	R6 823,40
	Groceries, toiletries		R32 568,00	R35 499,12
	Cellphone contract		R3 400,00	R3 706,00
	Store accounts (clothing, etc.)		R15 600,00	R17 004,00
	Medical aid	12 × 3 500 =	R42 000,00	R45 780,00
	Other medical costs		R8 280,00	R9 025,20
	House repairs and maintenance		R6 320,00	R6 888,80
	TV licence and satellite TV subscription	12 × 325 + 400 =	R4 300,00	R4 687,00
	School fees	3 × 12 × 4 000 =	R144 000,00	R156 960,00
	Total		R456 320,00	R494 202,80

b. Electricity, food, groceries, toiletries and public transport (assuming the niece's parents/guardians would still pay their school fees and medical costs).

c. These items would increase by about 50% (maybe less).

d. 2011 Expenditure		2012
House loan interest repayment	$12 \times 3\,440 =$	R41 280,00
Car hire purchase instalments	$12 \times 2\,950 =$ (not a variable cost)	R35 400,00
Electricity		R9 396,00
Household insurance	$12 \times 880 =$	R10 560,00
Food		R72 000,00
Petrol, car repairs		R24 956,00
Public transport		R6 260,00
Groceries, toiletries		R32 568,00
Cellphone contract		R3 400,00
Store accounts (clothing, etc.)		R15 600,00
Medical aid	$12 \times 3\,500 =$	R42 000,00
Other medical costs		R8 280,00
House repairs and maintenance		R6 320,00
TV licence and satellite TV subscription	$12 \times 325 + 400 =$	R4 300,00
School fees	$3 \times 12 \times 4\,000 =$	R144 000,00
Total		R456 320,00
		R559 724,88

Unit 3 Perimeter, area and volume

Learner's Book pages 250–269

Duration: 13½ hours

Teaching tips

- In order to tackle the material in this section, learners need to be confident with measuring length and with converting units. You may need to remind learners of the material covered in the relevant units.
- Make use of real examples to show learners how to calculate perimeter, area and volume. For example, you could ask learners to calculate all three for the classroom they are in.

Solutions



3.1 Practise measuring perimeters

Learner's Book page 252

1. Learners' own work
2. Learners' own work
3.
 - a. Perimeter = $39\text{ mm} + 39\text{ mm} + 69\text{ mm} + 69\text{ mm} = 216\text{ mm}$
 - b. Perimeter = $4 \times 29\text{ mm} = 116\text{ mm}$
 - c. Perimeter = $24\text{ mm} + 44\text{ mm} + 24\text{ mm} + 44\text{ mm} = 136\text{ mm}$
 - d. Perimeter = $29\text{ mm} + 39\text{ mm} + 49\text{ mm} = 117\text{ mm}$
 - e. Perimeter = $4 \times 57\text{ mm} = 228\text{ mm}$
 - f. Perimeter = $55\text{ mm} + 120\text{ mm} + 85\text{ mm} = 260\text{ mm}$

3.2 Practise calculating perimeters

Learner's Book page 256

- $P = 9 \text{ mm} + 12 \text{ mm} + 15 \text{ mm} = 36 \text{ mm}$
- $P = 4 \times 32,5 \text{ mm} = 130 \text{ mm}$
- $P = 2(17 \text{ cm} + 12 \text{ cm}) = 2(29 \text{ cm}) = 58 \text{ cm}$
- $P = 2 \times 3,142 \times 8,5 = 53,41 \text{ cm}$
- $P = 4 \times 25,3 \text{ cm} = 101,2 \text{ cm}$
- $P = 2 \times 3,142 \times 100 \text{ mm} = 628,4 \text{ mm}$
- $P = 10 \text{ cm} + 11 \text{ cm} + 12 \text{ cm} = 33 \text{ cm}$
- $P = 2(13,9 \text{ mm} + 6,2 \text{ mm}) = 2(20,1 \text{ mm}) = 40,2 \text{ mm}$

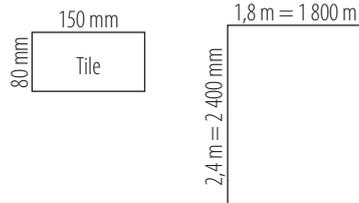
3.3 Practise using perimeters to calculate materials needed

Learner's Book page 257

- Learners' own work

- $P = 2(1\,800 \text{ mm} + 2\,400 \text{ mm})$
 $= 2(4\,200 \text{ mm}) = 8\,400 \text{ mm}$

$$\text{Number of tiles needed} = \frac{8\,400}{150}$$
$$= 56 \text{ tiles}$$



- The number of tiles required is an exact number, so they should not need to be cut.
 - 6 boxes
 - $6 \times R180 = R1\,080,00$
 - There will be 4 tiles left over.
- $4 \text{ cm} \times 20 = 80 \text{ cm wide}$
 - $9,5 \text{ cm} \times 20 = 190 \text{ cm}$
 $\therefore \text{length needed} = 1,9 \text{ m}$
 - She needs to buy 2 m of the fabric: $2 \times R59,95 = R119,90$
 - Yes, 0,30 m of fabric will be left.
 - Edge of sleeve = $2 \times 20 \text{ mm} \times 20 = 800 \text{ mm}$
Edge of neck = $60 \text{ mm} \times 20 = 1\,200 \text{ mm}$
Edge of hem = $40 \text{ mm} \times 20 = 800 \text{ mm}$
Total length of ribbon = $2\,800 \text{ mm}$
 $= 2,8 \text{ m}$
 - Cost of ribbon = $2,8 \times 11,95 = R33,46$
 - Fabric: $1,9 \text{ m} + 12\% \text{ of } 1,9 \text{ m} \approx 2,13 \text{ m}$. So she needs 2,5 m fabric.
Ribbon: $2,8 \text{ m} + 12\% \text{ of } 2,8 \text{ m} \approx 3,14 \text{ m}$
 - Bigger size costs = $2,5 \text{ m} \times R59,95 + 3,14 \text{ m} \times R11,95 = R187,40$
Original cost = $R119,90 + R33,46 = R153,36$
 $R187,40 - R153,36 = R34,04$
Bigger dress costs R34,04 more.

3.4 Practise using grid paper to measure

Learner's Book page 260

- Learners' own work
- Learners' own work
- Area (by calculation) = $12 \times 7 - 2 \times 2 = 80 \text{ m}^2$

3.5 Practise calculating areas

Learner's Book page 263

- $A = 14,3 \text{ cm} \times 14,3 \text{ cm} = 204,49 \text{ cm}^2$
 - $A = \frac{1}{2} \times 45 \text{ mm} \times 60 \text{ mm} = 1\,350 \text{ mm}^2$
 - $A = 260 \text{ cm} \times 120 \text{ cm} = 31\,200 \text{ cm}^2$

- d. $A = 3,142 \times (90 \text{ cm})^2 = 25\,450,2 \text{ cm}^2$
 $= 2,55 \text{ m}^2$
- e. $A = 1\,000 \text{ m} \times 350 \text{ m} = 350\,000 \text{ m}^2$
- f. $A = \frac{1}{2} \times 567 \text{ mm} \times 35 \text{ mm} = 9\,922,5 \text{ mm}^2$
- g. $A = 3,142 \times (350 \text{ mm})^2 = 384\,895 \text{ mm}^2$
- h. $A = 85,6 \text{ m} \times 85,6 \text{ m} = 7\,327,36 \text{ m}^2$
- i. $A = \frac{1}{2} \times 3,142 \times (12 \text{ cm})^2 = 226,22 \text{ cm}^2$
- j. $A = \frac{1}{4} \times 3,142 \times (62 \text{ mm})^2 = 3\,019,46 \text{ mm}^2$
- k. $A = \frac{3}{4} \times 3,142 \times (84 \text{ m})^2 = 16\,627,46 \text{ m}^2$
- l. $A = 35 \text{ cm} \times 35 \text{ cm} - 3,142 \times (16 \text{ cm})^2 = 420,65 \text{ cm}^2$
2. Learners' own work
3. a. $A = \frac{1}{2} \times 12 \text{ m} \times 14 \text{ m} + \frac{1}{2} \times 3,142 \times (7,6 \text{ m})^2 = 174,74 \text{ m}^2$
- b. i. Number of bags of fertiliser = $\frac{174,74}{10} \approx 18$ bags
 ii. Cost = $18 \times R35 = R630,00$
 iii. Yes, a small amount ($\pm \frac{1}{2}$ bag).
- c. WeedKill would be a better buy:
 A 250 ml bottle of WeedKill covers 30 m^2 of lawn.
 $\therefore 174,74 \text{ m}^2$ of lawn will be covered by: $\frac{174,74}{x} = \frac{30}{250}$
 $\therefore x = 1\,456,17 \text{ ml}$ WeedKill
 Cost: A 250 ml bottle of WeedKill costs R28,75
 \therefore Number of bottles needed = $\frac{1\,456,17}{250} = 5,82$ bottles ≈ 6 bottles
 \therefore Cost = $6 \times R28,75 = R172,50$
 A 1 l bottle of WeedTarget covers 50 m^2 of lawn.
 $\therefore 174,74 \text{ m}^2$ of lawn will be covered by: $\frac{174,74}{x} = \frac{50}{1}$
 $\therefore x = 3,49 \approx 3,5 \text{ l}$ WeedTarget
 Cost: A 1 l bottle WeedTarget costs R50,00
 \therefore Number of bottles needed = $\frac{3,5}{1} \approx 4$ bottles
 \therefore Cost = $4 \times R50,00 = R200,00$
 \therefore WeedKill would be the better buy.
- d. $3 + 7 = 10$ parts
 $250 \text{ ml} = 3$ parts
 $\therefore 10$ parts = $\frac{250}{3} \times 10 = 833,3 \text{ ml}$
 WeedKill covers 30 m^2 per 250 ml
 \therefore area of lawn covered = $\frac{833,3}{250} \times 30 \approx 100 \text{ m}^2$
- e. Total area of lawn = $174,74 \text{ m}^2$
 $R28,75$ WeedKill : $100 \text{ m}^2 = x : 174,74 \text{ m}^2$
 $\therefore \frac{R28,75}{100} \times \frac{x}{174,74}$
 $\therefore \frac{R28,75}{100} \times 174,74 = x$
 $x = R50,24$ – cost of fertilising the whole lawn



3.6 Practise doing volume conversions

Learner's Book page 266

Volume	Capacity
27 cm^3	27 ml
$1\,500 \text{ cm}^3$	$1,5 \text{ l}$
250 cm^3	250 ml
$0,875 \text{ m}^3$	875 l
45 m^3	45 000 l
35 m^3	35 kl

Volume	Capacity
750 mm ³	0,75 ml
6 800 cm³	6,8 ℓ
6,7 m ³	6 700 ℓ
0,45 m³	0,45 kl

Unit 4

Understanding instructions and assembly diagrams

Learner's Book pages 270–278

Duration: 4½ hours

Teaching tips

- Being able to read instructions is an important skill to have. It is particularly important when performing tasks that have safety considerations (such as wiring a plug). This is one of the reasons that instructions should be simple, clear and well-written.
- Learners should be able to identify instructions that are not clear. This is often the case for items manufactured in countries where English is not the primary language, or in countries that do not have high safety standards. You could have a class discussion about international safety standards and discuss the role of the South African Bureau of Standards (SABS). You can find out more at www.sabs.co.za.

Solutions



4.1 Practise reading and following instructions

Learner's Book page 270

- The first set is clearer because it breaks down the instructions to one step at a time.
 - You would definitely be able to wire a plug with the first set of instructions. You would struggle with the second set of instructions.
 - They are rather vague and not specific enough.
 - You have not been instructed to secure the electrical cord in the arrestor clips and to then replace the cover of the plug.
- Correct order (according to instruction set 1): C, D, A, F, E, B



4.2 Practise writing clear instructions

Learner's Book page 273

Learners' own work



4.3 Practise reading and making sense of instruction diagrams

Learner's Book page 273

- Remove the back cover by sliding it towards the bottom of the phone.
 - The phone has a SIM card slot.
 - The contacts of the SIM card must face down.
 - No
 - The back cover is replaced by sliding it towards the top of the phone.
- Connect the DVD player to the RF modulator using the cable with three coloured plugs.
 - Make sure you plug the plugs into the socket of the same colour.
 - Connect the RF modulator to the TV with the single cable. Use the 'To TV' socket on the modulator and the 'Cable/Antenna' socket on the TV.
 - Connect the antenna cable to the RF modulator using the 'Ant. In' socket.

» 4.4 Practise following instructions

Learner's Book page 274

Learners' own work

» 4.5 Practise making sense of assembly diagrams

Learner's Book page 277

1.
 - a. To make the skateboarder you place his body on his legs, the yellow collar around his neck, his head onto his body and finally his cap on his head.
 - b. Slot the two sets of wheels into the two clips under the skateboard.
 - c. Four parts
 - d. The arrows tell you to push the two halves of the ramp together.
 - e. The order of the skateboard does not matter. The order of the skateboarder does matter, but it can be completed in reverse. The order of the ramp is important. The order is necessary, because without completing the earlier steps there will not be place to fix other pieces.
2.
 - a. A storage box
 - b. You need a hex key and a screwdriver.
 - c. You should contact the supplier if you are not sure what to do.
 - d. Large screws, dowels and small screws.
 - e. The hex key is used to screw in the large screws.
 - f.
 - i) Attach three sides of the box to each other by using the dowels (Step 1).
 - ii) Screw the strips (feet) of the box to the bottom, using the small screws and screwdriver (Step 2).
 - iii) Slide the bottom of the box in the grooves of the sides to fit (Step 3).
 - iv) Use the dowels to attach the fourth side of the box the other sides (Step 4).
 - v) Use the hex key to screw the large screws into the sides of the box (Step 5).
 - vi) Turn the box around and use the hex key to screw in the large screws on the other side as well (Step 6).
3. Discussion

Unit 5 Floor plans

Learner's Book pages 279–289

Duration: 4½ hours

Teaching tips

- This unit is an extension of the skills developed in the section on maps. In this unit, learners will work with floor plans and will have to interpret and explain the information shown on these plans.
- Floor plans are an important tool in the planning of layout and arrangement of objects in a building. Working with floor plans also tests learners' skills of working with a scale and with 2D representation.
- Learners should have practice with drawing simple floor plans as well as interpreting them. You could ask them to draw a floor plan of the classroom, their bedroom or of a shop that they are familiar with.

Solutions



5.1 Practice describing items shown on a plan

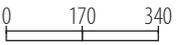
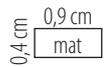
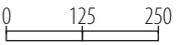
Learner's Book page 280

- Rectangular.
 - 4 rooms.
 - Kitchen/Living area (open plan)
 - Left in the corner of the kitchen/living room.
 - Inwards. The quarter-circle is drawn inside the bathroom.
 - Basin, toilet, shower.
 - Stove, cupboard, sink.
- 3 rooms.
 - Bath, basin, toilet, cupboards, bed, desk and chair.
 - No.
 - Quarter-circles.
 - 2 cupboards in the living room.
 - Outside wall of the bedroom and living room.
 - The size of each room is given on the plan.



5.2 Practise finding the size of items shown on a plan

Learner's Book page 281

- $6 \text{ cm} \times 5 \text{ cm (plan)} = 3 \text{ m} \times 2,5 \text{ m (actual)}$
 - $3,5 \text{ cm (plan)} = 175 \text{ cm (actual)}$
 - $2,5 \text{ cm (plan)} = 125 \text{ cm (actual)} = 1,25 \text{ m}$
 - $1,25 \times 1,25 = 1,5625 \text{ m}^2$
 - $27,5 \text{ cm (plan)} = 137,5 \text{ cm (actual)}$
 - $1\ 375 \text{ mm} \times 1\ 375 \text{ mm}$
 - One unit on the plan represents 170 actual units.
 - 
 - $4,5 \text{ cm} \times 170 = 765 \text{ cm}$
 - $3,2 \text{ cm} \times 170 = 544 \text{ cm}$
 - $1 \text{ cm} \times 170 = 170 \text{ cm}$
 - $6 \text{ cm} \times 170 = 1\ 020 \text{ cm (10,2 m)}$
 - $(4,5 \text{ cm} \times 170) \times (1,2 \text{ cm} \times 170) = 156\ 060 \text{ cm}^2 (15,606 \text{ m}^2)$
 - $1,6 \times 0,7 = 1,12 \text{ m}^2$
 - 
 - Sleeping area: $(2,5 \times 1,70) \times (3,2 \times 1,70) = 23,12 \text{ m}^2$
15 sleeping mats with 5 cm space all round:
 $15 \times (1,6 + 0,1) \times (0,7 + 0,1) = 20,4 \text{ m}^2$
The hikers should be able to sleep in the hut, but it probably would not be comfortable. Work this out by calculating the total floor area and the total area required for 15 mats. Remember that each mat will require some space around it – here we have allowed only 5 cm around each mat. If 10 cm was allowed around each mat then there would not be enough space for 15 people.
 - 1:125
 - 
 - $(5,2 \times 125) \times (5,6 \times 125) = 650 \text{ cm} \times 700 \text{ cm} = 6,5 \text{ m} \times 7 \text{ m}$
 - Volume = $l \times b \times h$
 $= 7 \times 6,5 \times 4$
 $= 182 \text{ m}^3$

- e. Two entrances
- f. Four storage cupboards
- g. $(2,5 \times 125) \times (0,3 \times 125) = 3,125 \text{ m} \times 0,375 \text{ m} = 1,17 \text{ m}^2$ (to two decimal places)
- h. Volume = $l \times b \times h$
 $= 3,125 \times 0,375 \times 1,2$
 $= 1,4 \text{ m}^3$
- i. 60 seats
- j. Approximately $(0,4 \times 125) \times (0,4 \times 125) = 2\,500 \text{ cm}^2$
- k. Approximately $0,4 \times 125 = 50 \text{ cm}$
- l. The seats could be numbered by row from A to F from the front and by position from 1 to 10 from the left.
- m. $2 \times 125 = 250 \text{ cm}$ (2,5 m)

» 5.3 Practise organising the furniture on a floor plan

Learner's Book page 285

1. Learners' own work

» 5.4 Practise using floor plans to calculate quantities

Learner's Book page 286

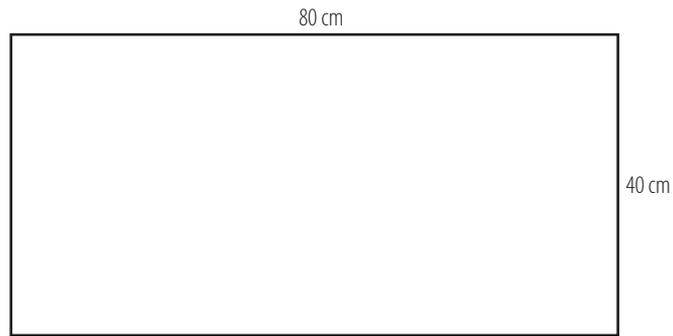
1.
 - a.
 - i. $300 + 150 + 300 + 150 - 2,6 - 2,6 = 894,8 \text{ m}$
 - ii. $894,8 \times R587 = R525\,247,60$
 - iii. The gates should be located near the parking lot so that cars can enter and exit easily.
 - b. Area = perimeter of tennis courts \times height
 $= (30 + (4 \times 15) + 30 + (4 \times 15)) \times 4$
 $= 720 \text{ m}^2$
 - c. Area = 100×60
 $= 6\,000 \text{ m}^2$
 - d.
 - i. Area = 300×150
 $= 45\,000 \text{ m}^2$
 - ii. $45\,000 - (100 \times 60) - (120 \times 40) - (50 \times 100) - (30 \times 60) - 6\,000$
 $= 21\,400 \text{ m}^2$
 - e. Volume = $l \times b \times h$
 $= 120 \times 40 \times 0,05$
 $= 240 \text{ m}^3$
 - f. Volume = area \times height
 $= 21\,400 \times 0,03$
 $= 642 \text{ m}^3$
2.
 - a. Learners redraw the plan
 - b. 2 sides of $5,8 \text{ cm} \times 500 = 2\,900 \text{ cm} = 29 \text{ m}$ each
 2 sides of $4,3 \text{ cm} \times 500 = 2\,150 \text{ cm} = 21,5 \text{ m}$ each
 2 sides of $4,1 \text{ cm} \times 500 = 2\,050 \text{ cm} = 20,5 \text{ m}$ each
 2 sides of $0,2 \text{ cm} \times 500 = 100 \text{ cm} = 1 \text{ m}$ each
 1 curved side $\approx 5 \text{ cm} \times 500 = 2\,500 \text{ cm} = 25 \text{ m}$
 - c. $2 \times 29 + 2 \times 21,5 + 2 \times 20,5 + 2 \times 1 + 25 = 169 \text{ m}$
 - d. $169 \div 3 = 56,3 \approx 57$ lengths
 - e. $57 \times 24,80 = R1\,413,60$



5.5 Practise drawing scaled plans

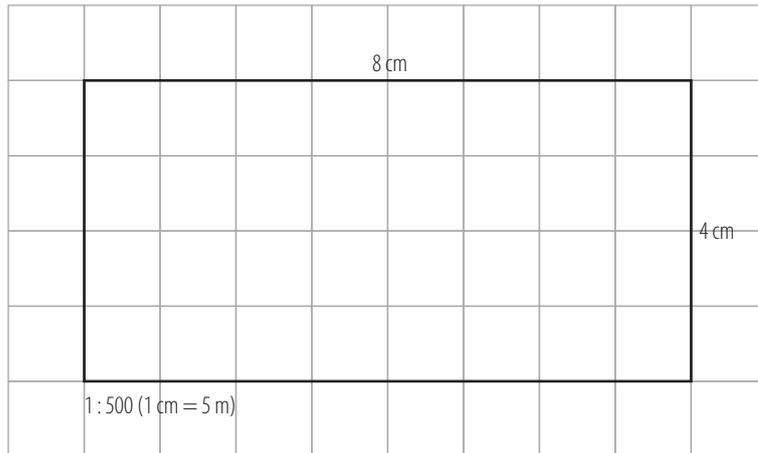
Learner's Book page 288

1. a.

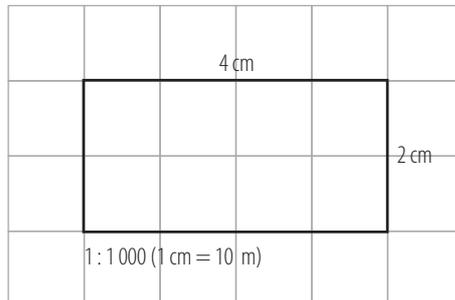


1 : 50 (1 cm = 0,5 m)

b.

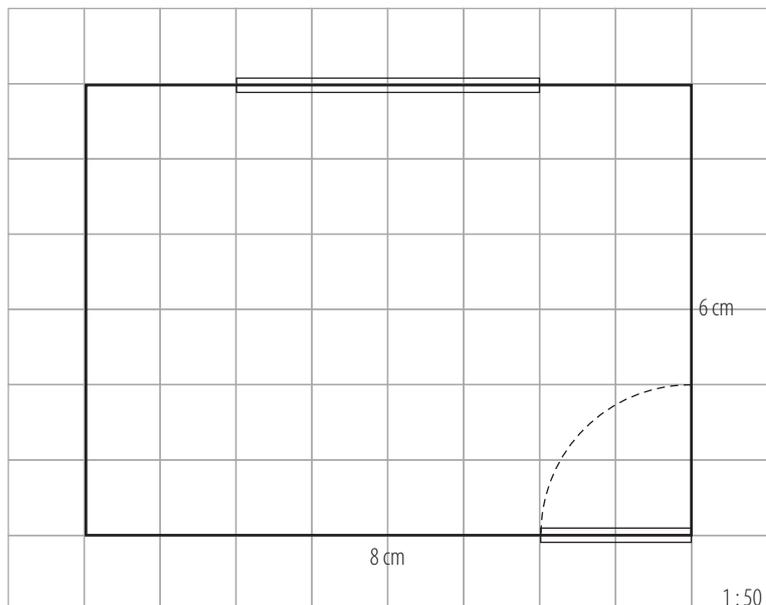


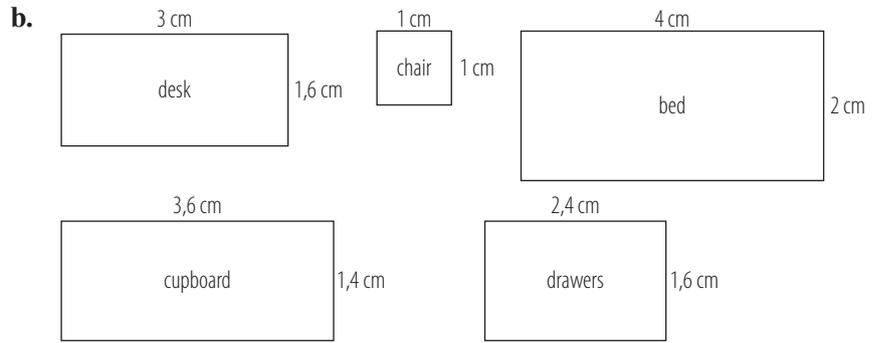
c.



2. Learners' own work

3. a.





- c.** Learners' own work
d. No, she won't be able to fit another bed into the room.

Unit 6

Using models to investigate shape and space

Learner's Book pages 290–292

Duration: 4½ hours

Teaching tips

- In this unit we develop learners' spatial skills to include 3D representations. Learners work with simple 3D shapes such as prisms and cylinders.

Solutions



6.1 Practise identifying the shape of an object

Learner's Book page 290

1. a.

Item	Name of solid shape	Number of faces (F)	Number of vertices (V)	Number of edges (E)
Packet of biscuits	cylinder	3	0	2
Block of margarine	cuboid/rectangular prism	6	8	12
Can of beans	cylinder	3	0	2
Box of juice	cuboid/rectangular prism	6	8	12
Shoe box	cuboid/rectangular prism	6	8	12
Tissue box	cube	6	8	12
Chocolate box	triangular prism	5	6	9

- b. i.** Packet of biscuits and can of beans.
ii. Packet of biscuits and can of beans.
c. The packet of biscuits and can of beans has rounded sides, which means that they are difficult to pack together without leaving space in between them. Also, the packaging doesn't really protect the biscuits, so they are easily damaged.



6.2 Practise investigating packaging arrangements

Learner's Book page 291

Learners' own work

Unit 1

Interest and interest rates

Learner's Book pages 294–299

Duration: 4½ hours

Teaching tips

- This unit requires learners to make calculations using percentages. If necessary, revisit Unit 12 in Term 1 from the Basic Skills section to revise working with percentages.
- At this stage learners will only be working with simple interest. This does not have many practical uses as most interest is calculated on a compound basis. Take this opportunity to explain to learners what interest is and why it is charged.

Solutions



1.1 Practise calculations with interest rates

Learner's Book page 298

- Interest after 3 years = $(1,3\% \text{ of } R750) \times 3$
= R29,25
 - Amount after 3 years = $R750 + R29,25$
= R779,25
 - 3,75%
 - Amount at end of 2011 = $R24\,350 + (3,75\% \text{ of } R24\,350) \times 4$
= $R24\,350 + R3\,652,50$
= R28 002,50
- Jonathan: Amount = $R3\,200 + (2,25\% \text{ of } R3\,200) \times 7$
= R3 704
Dipuo: Amount = $R11\,400 + (2,35\% \text{ of } R11\,400) \times 3$
= R12 203,70
Dipuo had the most money.
- Amount after 4 years = $R23\,000 + (3,75\% \text{ of } R23\,000) \times 4$
= R26 450
Siven withdraws R7 000: $R26\,450 - R7\,000 = R19\,450$
Amount after a further 4 years = $R19\,450 + (2,35\% \text{ of } R19\,450) \times 4$
= R21 278,30
When Siven closed his account, he had R21 278,30.
- Interest = $(10\% \text{ of } R5\,000) \times 3$
= R1 500
 - Amount to be repaid = $R5\,000 + R1\,500 = R6\,500$
 - Interest = $(8\% \text{ of } R9\,000) \times 2$
= R1 440
 - Amount to be repaid = $R9\,000 + R1\,440 = R10\,440$
 - Interest = $(9,5\% \text{ of } R12\,000) \times 2$
= R2 280
 - Amount to be repaid = $R12\,000 + R2\,280 = R14\,280$

- d. i. Interest = $(11\% \text{ of } R23\ 000) \times 5 = R12\ 650$
 ii. Amount to be repaid = $R23\ 000 + R12\ 650 = R35\ 650$
5. a. Total amount after:
 1 year = $R8\ 000 + (12,9\% \text{ of } R8\ 000)$
 $= R8\ 000 + R1\ 032 = R9\ 032$
 2 years = $R8\ 000 + (12,9\% \text{ of } R8\ 000) \times 2$
 $= R10\ 064$
 3 years = $R8\ 000 + (12,9\% \text{ of } R8\ 000) \times 3$
 $= R11\ 096$
 4 years = $R8\ 000 + (12,9\% \text{ of } R8\ 000) \times 4$
 $= R12\ 128$
 5 years = $R8\ 000 + (13,5\% \text{ of } R8\ 000) \times 5$
 $= R13\ 400$
 6 years = $R8\ 000 + (13,5\% \text{ of } R8\ 000) \times 6$
 $= R14\ 480$
 7 years = $R8\ 000 + (13,5\% \text{ of } R8\ 000) \times 7$
 $= R15\ 560$
- b. 1 year: Interest = $R1\ 032$
 2 years: Interest = $R2\ 064$
 3 years: Interest = $R3\ 096$
 4 years: Interest = $R4\ 128$
 5 years: Interest = $R5\ 400$
 6 years: Interest = $R6\ 480$
 7 years: Interest = $R7\ 560$
- c. You save on interest.
 d. Your monthly repayments are less.
6. Interest for 1 year = $15,5\% \text{ of } R780$
 $= R120,90$
 Monthly repayment = $\frac{R120,90}{12} = R10,08$

Unit 2

Reading bank account statements

Learner's Book pages 300–312

Duration: 3 hours

Teaching tips

- Learners may already have opened some form of bank account. If they have, you could encourage them to bring to class a statement, ATM slip or pamphlet about the account they have opened.
- Since almost everyone will have a bank account at some stage, this is a useful time to discuss the purpose of a bank account and the role of banks in managing people's money. People also often complain that banks charge high service fees; encourage learners to be aware of how these fees can affect their savings and budgets.
- It is important that learners be able to identify the key features of different types of bank account so that they can choose one that is appropriate for their needs.

Solutions



2.1 Practise reading bank statements

Learner's Book page 308

Teacher will provide bank statements.



2.2 Practise calculating and choosing bank fee options

Learner's Book page 310

1. Learners' own work

2. a. Option 1 would suit people who do not perform many transactions each month. They would pay for each transaction.

Option 2 would suit people who perform a lot of transactions each month. The monthly charge of R99 would probably be less than if they paid for each transaction.

Option 3 would suit people who intend to keep a large amount of money with the bank. The more money saved, the lower the transaction charges.

b. Learners' own answer

Transaction	Option 1 charge	Option 2 charge	Option 3 charge
2 cash withdrawals per week of R400	$400 \times 0,009 =$ R3,60 (less than the minimum) So $2 \times 16,25 =$ R32,50	Free	
4 electronic account payments	$4 \times 2,90 + (0,0053 \times 544) + (0,0053 \times 75) + (0,0053 \times 280) + (0,0053 \times 650) =$ R19,81	Free (electronic transactions)	
2 debit orders	$2 \times 2,90 + (0,01 \times 120) + (0,01 \times 500) =$ R12,00	Free (electronic transactions)	
1 stop order for R405	$2,90 + (0,0053 \times 405) =$ R5,05	Free (electronic transaction)	
5 cheques	$5 \times 2,90 + (5 \times 0,011 \times 250) =$ R28,25 (Assuming an average amount of R250.)	Free	
1 cheque	$2,90 + (0,011 \times 1\ 350) =$ R17,75	Free	
Cash deposit of R800	$2,90 + (0,009 \times 800) =$ R10,10	Free (at the ATM)	
Salary cheque deposit	Free	Free	
Total	R125,46	R99 monthly fee	Since we don't know if Zwelihle maintains a minimum balance, we assume that she doesn't.

Zwelihle should choose Option 2.

b. i. $99 \times 1,05 =$ R103,95

ii. $99 \times 1,05 \times 1,05 \times 1,05 =$ R114,60

c. Assuming she uses Option 2, her bank charges should not go up. (Option 2 is based on the *number* of transactions she makes.)

- d. If she chooses Option 2 she will not pay any fees on her transactions and she would be managing her money well.

Unit 3 Value-added tax (VAT)

Learner's Book pages 313–318

Duration: 1½ hours

Teaching tips

- Because VAT is mostly already added to the goods that we buy, consumers tend not to notice it. However, tourists who buy goods to take with them out of the country can claim VAT back on their purchases and this can amount to a significant saving. A purchase of R3 500, for example, leads to a refund of just over R400.
- You might like to compare VAT rates for different countries in the world. You could discuss why countries have different VAT rates. A list of tax rates can be found at http://en.wikipedia.org/wiki/Tax_rates_around_the_world. You could also discuss the advantages and disadvantages of zero-rated goods.
- Learners need to be very confident with percentage calculations in this unit. They will have had practice in Term 4, Unit 1, but if practice is still needed you can refer back to Unit 12 in Term 1.

Solutions



3.1 Practise VAT calculations

Learner's Book page 317

1. a. Muesli $27,69 \times 0,14 = R3,88$
 Orange juice $10,49 \times 0,14 = R1,47$
 Cheese rolls $2,49 \times 0,14 = R0,35$
 Fancy rolls $1,85 \times 0,14 = R0,26$
 Milk Zero-rated
 Carrier bag $0,30 \times 0,14 = R0,04$

b. Learners compare their estimates.

c. Method 1

$$(27,69 + 3,88) + (10,49 + 1,47) + (2,49 + 0,35) + (1,85 + 0,26) + (3,19) + (0,30 + 0,04) = R52,01$$

Method 2

$$(27,69 + 10,49 + 2,49 + 1,85 + 0,30) \times 1,14 = R48,81 + R3,19 = R52,00$$

(The difference in the answers comes from rounding off the answers in question 1.)

2. i. Basic cord $39,95 \div 1,14 = R35,04$
 Spiderman short $65,00 \div 1,14 = R57,02$
 Generic trainer $140,00 \div 1,14 = R122,81$
 Single grey tr $65,00 \div 1,14 = R57,02$
 7 pk plain briefs $75,00 \div 1,14 = R65,79$
- ii. Basic cord $39,95 - R35,04 = R4,91$
 Spiderman short $65,00 - R57,02 = R7,98$
 Generic trainer $140,00 - R122,81 = R17,19$
 Single grey tr $65,00 - R57,02 = R7,98$
 7 pk plain briefs $75,00 - R65,79 = R9,21$

3.
 - a. R79,09
 - b. The VAT was calculated on the total amount charged for water, refuse and sewerage: $(R290,05 + R75,44 + R199,41) \times 0,14 = R79,09$
 - c. Rates are excluded from VAT because they are a tax.
 - d. On the bill, amounts that are subjected to VAT are marked with an asterisk (*).
4. Learners' own work

Unit 4

Collecting data

Learner's Book pages 319–332

Duration: 4½ hours

Teaching tips

- This and the following units focus on the steps in a statistical investigation. Refer learners to the flow diagram at the beginning of the unit to show them how the steps fit together. It helps if they understand that the process is circular: the investigation does not stop after the results have been interpreted and analysed as the conclusions often lead to new questions.
- Often the key to a successful investigation is asking the right question. Learners need practice in being very specific in the way they frame a research question. You could supply them with some imaginary research questions and ask them to explain how the questions are unclear or inappropriate.
- Likewise, the tools used to collect data should be appropriate for the question they are being used to answer. Surveys and questionnaires in particular need to be very carefully set out. Spend as much time as necessary looking critically at the examples given in the Learner's Book.

Solutions



4.1 Practise developing useful questions

Learner's Book page 320

1. Shafiek could have asked:
'What is your highest *percentage* for a *Maths Literacy* test so far this year?'
2.
 - a. Not clear whether it's your favourite sport that you enjoy playing or that you enjoy watching and following.
 - b. What kind of books? Text book or fiction?
 - c. Clear
 - d. Clear
 - e. Clear
 - f. Clear
 - g. The amount of airtime used per week is variable so could have asked how many minutes of airtime you use each week on average.
 - h. Clear
3. Learners' own work



4.2 Practise classifying data

Learner's Book page 321

- a.
 - i. Interviews and questions
 - ii. Primary source

- b. i. Interview and questions
ii. Primary source
- c. i. Internet/newspapers etc.
ii. Secondary source
- d. i. Ask teacher
ii. Primary source
- e. i. Ask teacher/admin staff
ii. Primary source
- f. i. Own research
ii. Primary source
- g. i. Own research/ask teacher
ii. Primary source
- h. i. Interviews and questions
ii. Primary source
- i. i. Own enquiries/Internet
ii. Secondary source
- j. i. Own observation/questionnaire
ii. Primary source
- k. i. Questionnaire
ii. Primary source

» 4.3 Practise collecting data by observation

Learner's Book page 322

Learners' own work

» 4.4 Practise collecting data by doing an interview

Learner's Book page 322

Learners' own work

» 4.5 Practise collecting data by doing a survey

Learner's Book page 323

Learners' own work

» 4.6 Practise identifying representative samples

Learner's Book page 325

1. a. If the group of Grade 10s was not selected randomly the sample would be biased.
b. Unbiased
c. Unbiased
d. Biased. The sample of learners that he is asking about how they got to school is too small. Only spending 15 minutes interviewing learners means that the sample is not representative of all the learners.
e. Unbiased
2. Learners' own work
3. The learners who are in the library after school are less likely to play sport than the rest of the learners in general.
a. Disagree b. Agree c. Agree
d. Agree e. Agree

» **4.7 Practise** planning a survey and selecting a sample

Learner's Book page 327

Learners' own work

» **4.8 Practise** designing items for a questionnaire

Learner's Book page 329

1. Learners' own work
2. a, b, b, b
3.
 - a. The way the question is worded encourages people to give a particular answer.
 - b. There are not enough options.
Suggestions: Less than $\frac{1}{2}$ hour
Between $\frac{1}{2}$ hr and 1 hr
More than 1 hr
 - c. There are too few options.
 - d. People are unlikely to answer honestly unless confidentiality is assured.

» **4.9 Practise** using a questionnaire to collect data

Learner's Book page 331

Learners' own work

» **4.10 Practise** using a questionnaire to collect data (2)

Learner's Book page 331

Learners' own work

» **4.11 Practise** deciding which method of data collection to use

Learner's Book page 332

- | | | |
|-------------------|------------------|------------------|
| 1. a. observation | b. observation | c. interview |
| d. interview | e. questionnaire | f. questionnaire |
| g. interview | h. interview | i. questionnaire |

Unit 5 Classifying and organising data

Learner's Book pages 333–339

Duration: 4½ hours

Teaching tips

- This unit asks learners to distinguish between different types of data, specifically categorical data and numerical data. Numerical data can be divided into either discrete data or continuous data. Although discrete data is assigned a number, it is usually incorrect to perform mathematical calculations using these numbers.
- Organising collected data is an important part of the investigation process. Investigations often lead to having to deal with large amounts of data, so the data needs to be organised in a way that makes it easier to work with. A frequency table is a handy tool to do this.

» 5.3 Practise reading a grouped frequency table

Learner's Book page 338

- 5
- No, you cannot. Once data is grouped, the actual value is lost.
- No learners got 45 marks as there are no marks in the 41-50 mark interval.
- 16
- 13

» 5.4 Practise drawing and interpreting a grouped frequency table

Learner's Book page 339

a.

Total spent (R)	Tally	Frequency
0–9,99		7
10–19,99		9
20–29,99		5
30–39,99		2
40–49,99		1
50–59,99		1
Total		25

- 16
- 1
- R10,00 – R19,99

Unit 6 Summarising data

Learner's Book pages 340–351

Duration: 4½ hours

Teaching tips

- Learners should not find it difficult to calculate the basic statistical measures such as average (mean, median and mode) and range as they will have had experience of it from previous grades. However, choosing the correct average to use will need some practice.
- Calculating the median from a frequency table is a little more difficult, so spend as much time here as necessary.

Solutions

» 6.1 Practise calculating the mean

Learner's Book page 342

- Mean = $\frac{2\,074}{12} = 172,83$
 - Mean = $\frac{635}{10} = 63,5$
 - Mean = $\frac{285}{10} = 28,5$
 - Mean = $\frac{133}{7} = 19$
 - Mean = $\frac{140}{9} = 15,56$
- Mean mass = $\frac{325}{6} = 54,167$ kg
- $fx: 0 \times 10 = 0$
 $1 \times 23 = 23$
 $2 \times 12 = 24$
 $3 \times 9 = 27$
 $4 \times 5 = 20$
 $5 \times 2 = 10$
Total (fx) = 104

- e. $\frac{9}{2} = 4,5$
 \therefore median is the 5th value
 10 13 14 14 (15) 15 18 20 21
 median = 15
2. a. Total frequency = 61
 $\frac{61}{2} = 30,5$
 \therefore median is the 31st value
 median = 1
- b. Total frequency = 67
 $\frac{67}{2} = 33,5$
 \therefore median is 34th value
 median = 2
- c. Total frequency = 149
 $\frac{149}{2} = 74,5$
 \therefore median is 75th value
 median = 2

» 6.4 Practise finding the range

Learner's Book page 348

1. a. Highest value = 177
 Lowest value = 170
 Range = $177 - 170 = 7$
- b. Highest value = 70
 Lowest value = 55
 Range = $70 - 55 = 15$
- c. Highest value = 44
 Lowest value = 14
 Range = $44 - 14 = 30$
- d. Highest value = 30
 Lowest value = 10
 Range = $30 - 10 = 20$
- e. Highest value = 21
 Lowest value = 10
 Range = $21 - 10 = 11$
2. Highest value = 31
 Lowest value = 26
 Range = $31 - 26 = 5$

» 6.5 Practise finding summary statistics

Learner's Book page 348

1. Mean of first three throws = $\frac{(1+1+4)}{3} = \frac{6}{3} = 2$
 Let score on die for fourth throw = x
 $\therefore \frac{1+1+4+x}{4} = 2 + 1$
 $\therefore \frac{6+x}{4} = 3$
 $\therefore 6 + x = 12$
 $\therefore x = 12 - 6$
 $\therefore x = 6$

2. a.

Number of movies	Tally	Frequency
0		5
1		9
2		15
3		11
4		8
5		7
6		2
7		2
8		1
Total		60

b. mode = 2

c. $fx: 0 \times 5 = 0$

$1 \times 9 = 9$

$2 \times 15 = 30$

$3 \times 11 = 33$

$4 \times 8 = 32$

$5 \times 7 = 35$

$6 \times 2 = 12$

$7 \times 2 = 14$

$8 \times 1 = 8$

Total (fx) = 173

Mean = $\frac{173}{60} = 2,88$

d. Range = $8 - 0 = 8$

3. a.

Number of learners	Tally	Frequency
10		2
12		7
13		4
14		3
16		4
Total		20

b. mean

$fx: 10 \times 2 = 20$

$12 \times 7 = 84$

$13 \times 4 = 52$

$14 \times 3 = 42$

$16 \times 4 = 64$

Total (fx) = 262

mean = $\frac{262}{20} = 13,1 \approx 14$ learners

median

$\frac{20}{2} = 10$ median is the 11th value

median = 13

mode = 12

range = $16 - 10 = 6$



6.6 Practise choosing averages

Learner's Book page 351

- 25
 - Range = $41 - 3 = 38$
 - No, as the values have a large range.
- Learners' own work
 - The mode would show which card was drawn most often (if there is a mode).
- The mode – when asked, most teenagers would have said more than an hour per day.
- Life Science was the most popular choice for girls – she used the mode.
- She could find the mean time it took her learners to complete 10 questions and then adjust the number of questions in the exam paper so that the average learner could complete it in the time allocated.

Unit 7 Representing data

Learner's Book pages 352–359

Duration: 4½ hours

Teaching tips

- In this unit, learners explore the variety of graphs used to convey the results of an investigation. It may be useful for you to revise graphs, covered in Unit 13 of Term 1 in the Basic Skills section.
- The table on page 356 of the Learner's Book is a useful summary for learners to refer to when trying to decide which type of graph to use.
- Encourage learners to draw their graphs carefully and accurately. They should use the correct instruments (sharp pencil, ruler, protractor etc.) and the use of colour is encouraged.
- If you have access to a computer, you could introduce learners to drawing graphs using a computer (with software such as Microsoft Excel). Excel can also be used to tabulate data and perform statistical calculations.

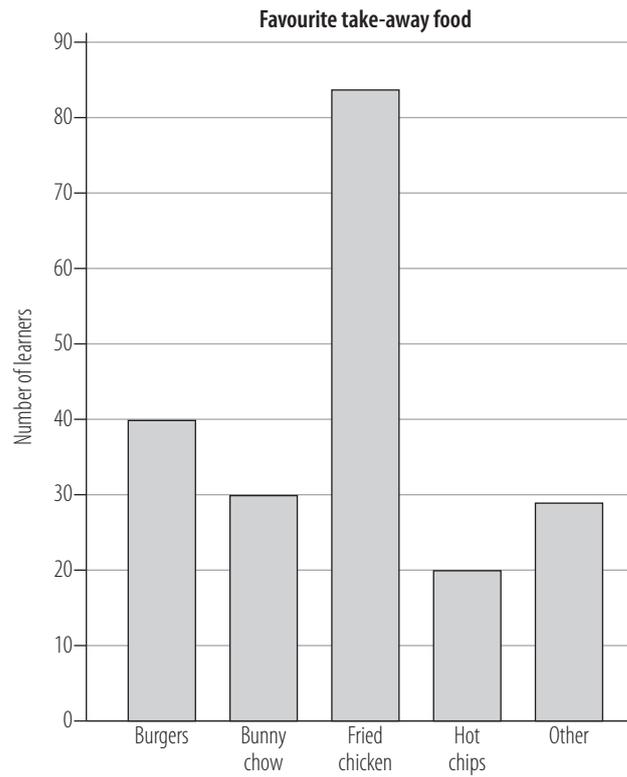
Solutions



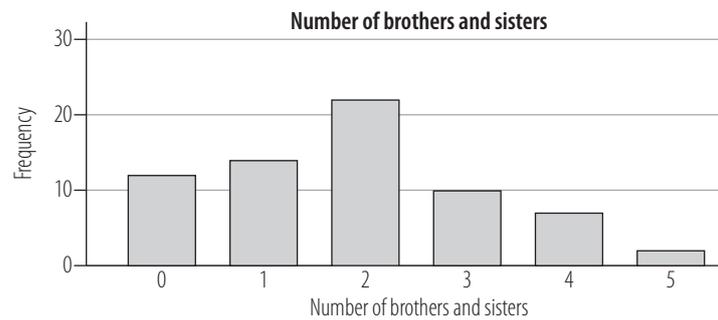
7.1 Practise drawing bar graphs

Learner's Book page 353

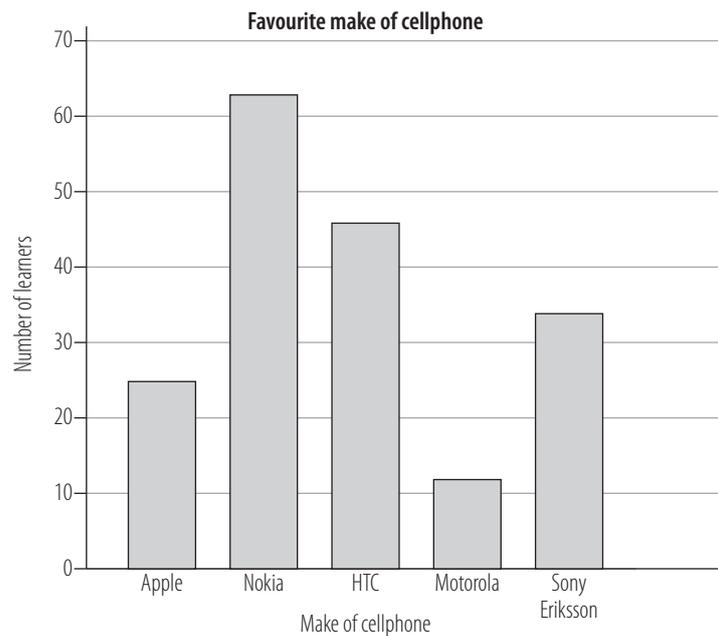
1. a.



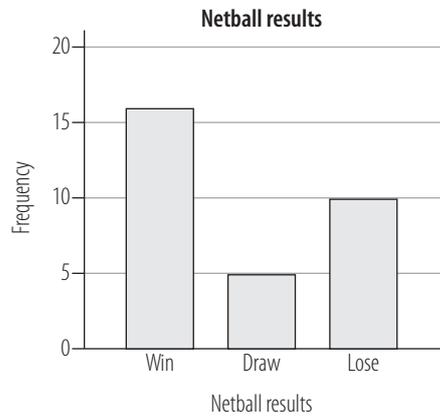
b.



c.



d.



» 7.2 Practise drawing pie charts

Learner's Book page 355

- English $\frac{130}{698} \times 360^\circ = 67^\circ$

Afrikaans $\frac{144}{698} \times 360^\circ = 74,27^\circ$

Xhosa $\frac{98}{698} \times 360^\circ = 50,54^\circ$

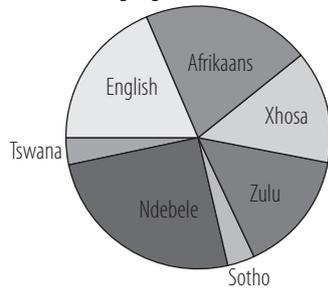
Zulu $\frac{104}{698} \times 360^\circ = 53,64^\circ$

Sotho $\frac{24}{698} \times 360^\circ = 12,38^\circ$

Ndebele $\frac{176}{698} \times 360^\circ = 90,77^\circ$

Tswana $\frac{22}{698} \times 360^\circ = 11,35^\circ$

Home language of learners at a school



- Apple $\frac{25}{180} \times 360^\circ = 50^\circ$

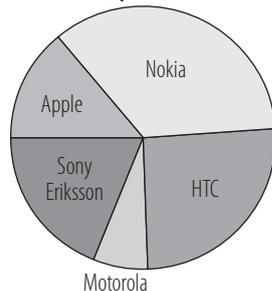
Nokia $\frac{63}{180} \times 360^\circ = 126^\circ$

HTC $\frac{46}{180} \times 360^\circ = 92^\circ$

Motorola $\frac{12}{180} \times 360^\circ = 24^\circ$

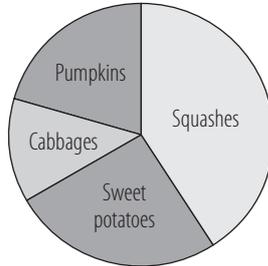
Sony Eriksson $\frac{34}{180} \times 360^\circ = 68^\circ$

Makes of cellphones of learners



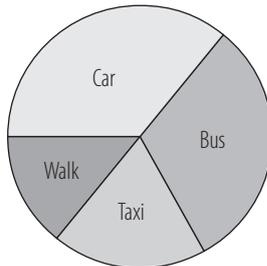
3. Squashes $\frac{0,4}{1} \times 360^\circ = 144^\circ$
 Pumpkins $\frac{0,25}{1} \times 360^\circ = 90^\circ$
 Cabbages $\frac{0,15}{1} \times 360^\circ = 54^\circ$
 Sweet potatoes $\frac{0,2}{1} \times 360^\circ = 72^\circ$

Amount of land used to grow different vegetables in school garden



4. Car $\frac{36}{100} \times 360^\circ = 129,6^\circ$
 Taxi $\frac{31}{100} \times 360^\circ = 111,6^\circ$
 Bus $\frac{19}{100} \times 360^\circ = 68,4^\circ$
 Walk $\frac{14}{100} \times 360^\circ = 50,4^\circ$

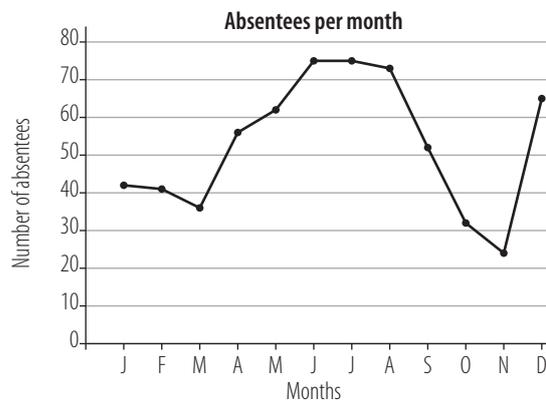
Transport used by learners to travel to school and back



7.3 Practise drawing line graphs

Learner's Book page 357

1. a.



- b. June and July. The graph is horizontal between these two points.
 c. Number of absentees increase due to winter colds and flu.
 d. Absenteeism dropped – learners had to come and write the exams.
2. Learners' own work



7.4 Practise choosing and drawing graphs

Learner's Book page 358

1. a.

Type of transport	Frequency
Walk	9
Bus	10
Taxi	11
Cycle	5
Other	1

b. A bar graph or a pie chart would be suitable.

2. a. A bar graph or a pie chart would be suitable.

b. Learners' own work

3. Learners' own work

Unit 8

Interpreting and analysing data

Learner's Book pages 360–369

Duration: 4½ hours

Teaching tips

- Learners need to approach the interpretation and analysis of data in two ways. They need to be able to do this with their *own* data, but they also need to be able to look critically at data that is presented to them by other people. Hopefully in working through the ways of interpreting and analysing their own data they will see how easy it is to manipulate data to give the wrong impression.
- It is important for learners to be critical of statistics. Organisations often use statistics for marketing purposes and will present them in a way that attracts as many customers as possible, even though they are misleading.
- If you have time at this stage, asking learners to perform their own investigation will be a very useful way of combining all the skills they have used in this section on data handling. The investigation can be kept simple, but it should be one that leads to data that can be tabulated and graphed.

Solutions

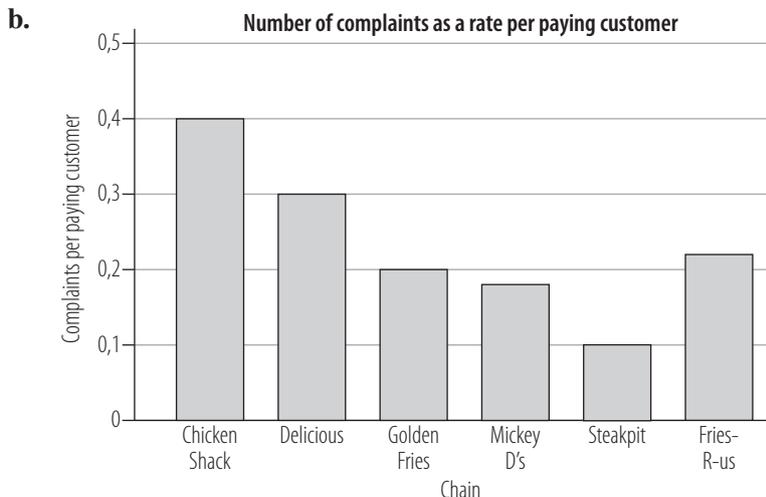


8.1 Practise interpreting data

Learner's Book page 361

- a. The fact that the people were going into the cellphone shop means that the survey was not random. The fact that they are visiting a cellphone shop means that they are more likely to have a contract than the general population.
 - b. What percentage is 100 learners compared to all the learners at the school? In all likelihood these 100 learners would only represent a small percentage of all the learners at the school.
 - c. The sample is too small.
 - d. What percentage is 50 learners compared to all the learners at the school? In all likelihood these 50 learners would only represent a small percentage of all the learners at the school.
- a. If the 200 learners surveyed represented most of the learners at the school

- b. If the 200 learners surveyed only represented a small percentage of the learners at the school
3. a. You need to know the number of complaints as a percentage of the total number of customers if you want to make a fair comparison or as the rate per paying customer.



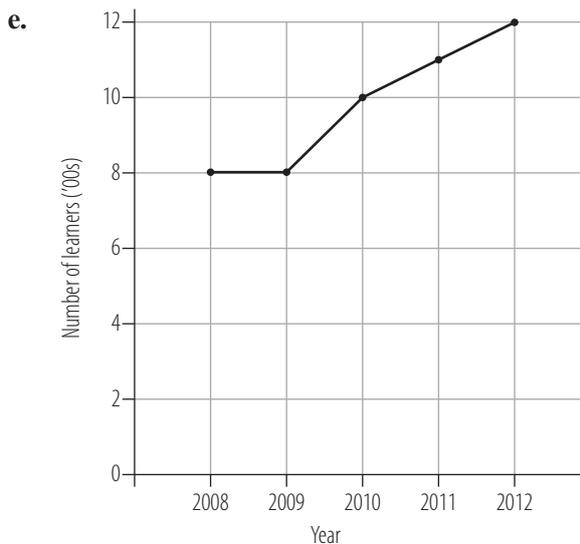
- c. The best food place is the Steakpit as it has the lowest rate of complaints per customer and the worst food place is Chicken Shack as it has the highest rate of complaints per customer.
4. Learners' own work



8.2 Practise interpreting and analysing graphs

Learner's Book page 365

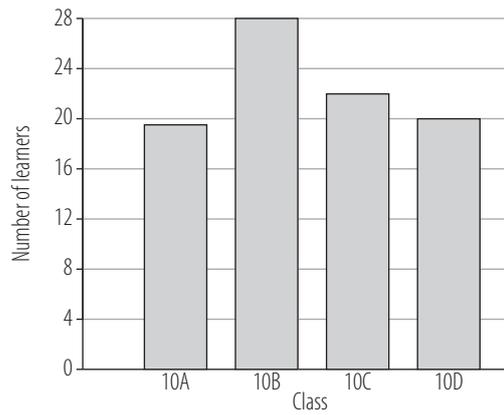
1. a. 0 learner
 b. 800 learners
 c. Increase of 800. Maths Literacy was not offered at the school in 2007.
 d. The graph gives the impression that there was a large increase in the number of learners taking Maths Literacy from 2007 to 2008 without making it clear that Maths Literacy was not offered in 2007.



2. a. 10A – 19
 10B – 28
 10C – 22
 10D – 20

b. The vertical scale of the graph does not start from zero.

c. **Number of learners sent to the office for misbehaving**



3. a. • True

• Not necessarily true

b. Learners' own answers

4. a. The boys' pie chart is much bigger than the girls', which suggests that more boys than girls were involved in the survey.

b. Draw both pie charts the same size.

c. You would be able to compare the pie charts better, knowing that each degree in both pie charts represents the same number of learners.

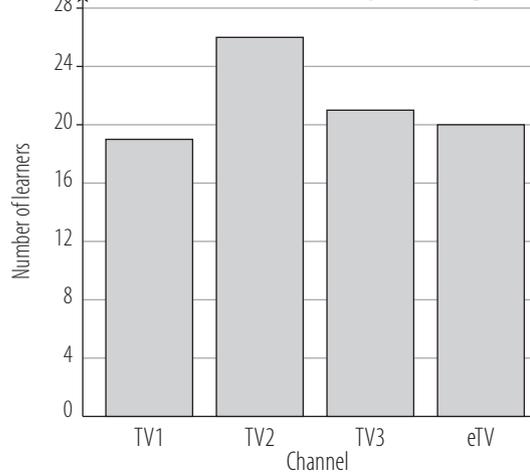
5. a. 5

b. 6

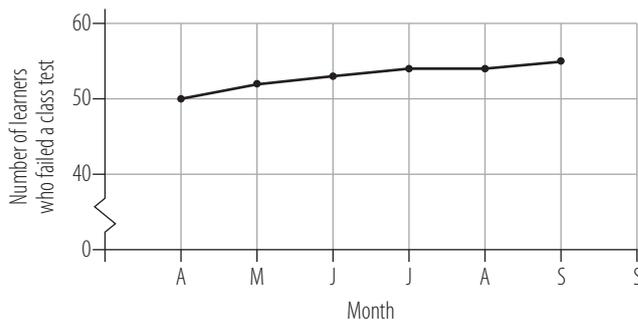
c. 7

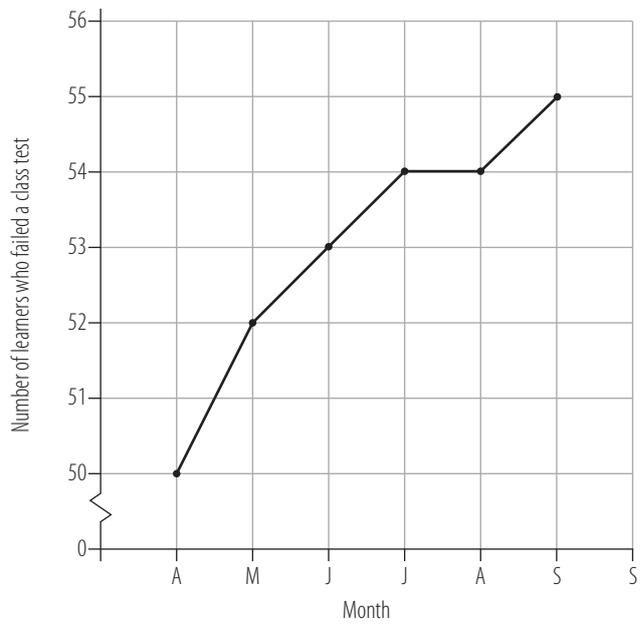
d. The vertical scale of the graph does not start at zero.

e. **Preferred channel for 7–8 p.m. viewing**



6. The first line graph makes it look like the number of failures is barely rising while the second graph makes it look like the number of failures increases dramatically over the time period.





SECTION 4

RESOURCES

A. Projects

PROJECT 1 An information booklet on household finances for young people

To manage your daily life, you need a range of mathematical skills and a lot of information about how different systems work in South African society; how and when to pay your bills for household services, school fees, rates and taxes; how to get access to social welfare grants from the government; how much it will cost you to borrow money; how to open a bank account; and many other things. You may be fortunate enough to live in a household with adults who know how to do all these things, and who can show you what you need to know as you become old enough to take responsibility for the financial side of your life.

But many South Africans don't have access to people who can help them in this way. One such group consists of young people who have had to take responsibility for managing the money and the household for their younger brothers and sisters, because their adult caregivers have died of Aids.

Your portfolio project is to compile an information booklet for this group of people, in which you present useful information on managing a family's household, education, health and other finances, and give advice on what forms of help are available for families without adult caregivers.

Your project work should cover the following stages.

Research

Meet with at least one young person who heads a family household, but if possible arrange a meeting of two or three people in this situation. Ask questions about what their problems are, what they don't understand or know about, and how they cope with the financial needs of their family. Take notes of what they tell you.

Then use these notes to work out a list of topics that you think would be helpful for young people in this situation.

Find out about social grants, family support projects, and other systems that may exist to help child-headed households. Interview a bank manager to find out how banks are helping households whose adult members have died, so that the children can get access to their parents' money or stay in the house their parents were paying off to the bank. Find out whether it costs money to visit a hospital or clinic, and get medicines, if you are unemployed.

Planning

Plan the information booklet. These are some of the questions you should consider:

- What language should the booklet be written in?
- What topics should it cover?

- What mathematical skills should be explained in the booklet?
- What names and addresses of helpful organisations should you include?

Writing

As you write each section of the material, choose examples and work them out so that readers will be able to see how to use the methods you describe. Check whether a reader will understand your explanations and examples by trying out the material on other learners, as you write each section.

Design and print

Choose a design and layout for the material that you think will make it easy to read. Talk to other groups in your class about options for getting the booklets printed. If you don't have printing or photocopying equipment in the school, you may need to ask local photocopy shops or small printers to give you quotations for how much they would charge to print the booklet. Plan ways to raise money to cover the cost of printing.

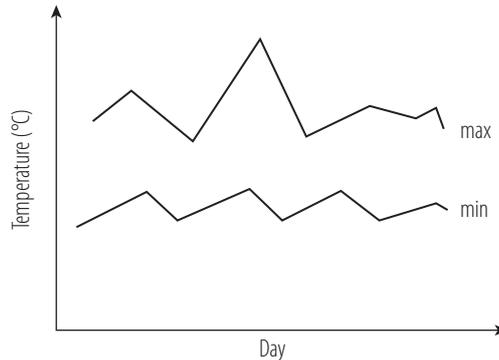
PROJECT 2

Maximum and minimum temperatures

Work in groups.

Divide the towns and cities in your province (or the whole country) among the learners in the class. Do the following for the town or city allocated to you:

1. Collect the maximum and minimum temperature readings for your town from newspapers or TV for 3 weeks. Record the results in a table.
2. Draw graphs of maximum and minimum temperatures, showing both graphs on the same pair of axes.



3. On which day was the highest maximum temperature recorded?
4. On which day was the lowest minimum temperature recorded?
5. On which day was the difference between the minimum and the maximum temperature the greatest?
6. Calculate the average minimum and average maximum temperature for the period.
7. Discuss and compare your results with those of the rest of the class and write a paragraph about your conclusions. Present your group's findings to the class.

PROJECT 3

Product design

When you plan to design and make an item, you need to know:

- what materials and tools you will need
- how much of each type of material you will need
- the cost of the materials.

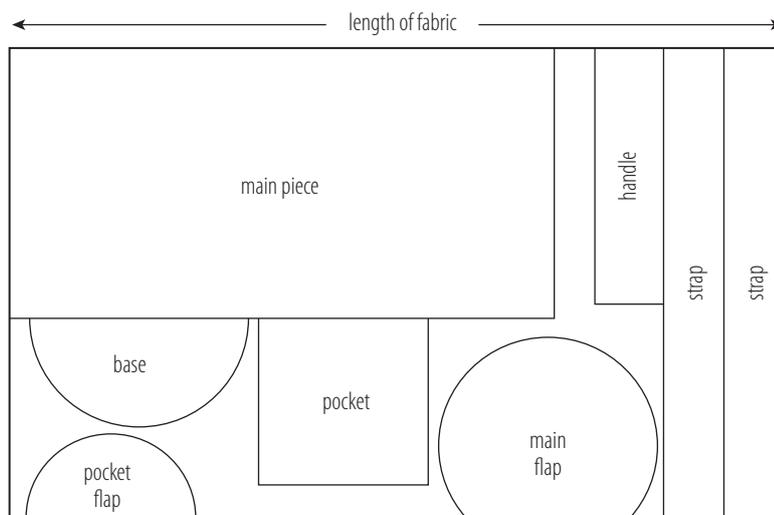
Choose one of the core projects that follow. If you have time, do one of the optional projects once you have complete the core project.

Core project 3a A backpack



This backpack is made of stiff fabric, and is suitable for carrying light loads.

The pattern pieces that need to be cut from the fabric are shown below, drawn to a scale of 1 : 10.

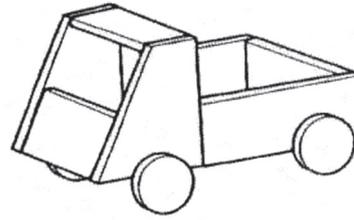


1. What is the length of the fabric used?
2. What width of fabric will you need?
3. If the fabric costs R149,90 per metre, what will the total cost of the fabric be?
4. A contrasting edge is sewn around the top flap and pocket flap. Estimate the amount of edging needed. If the edging costs R16,00 per metre, what is the cost of the edging?
5. The extra materials required are two large buttons (R8,50 each), 1 m cord for the drawstring (R14,50), and sewing thread (R21,00). What is the total cost of making the backpack?

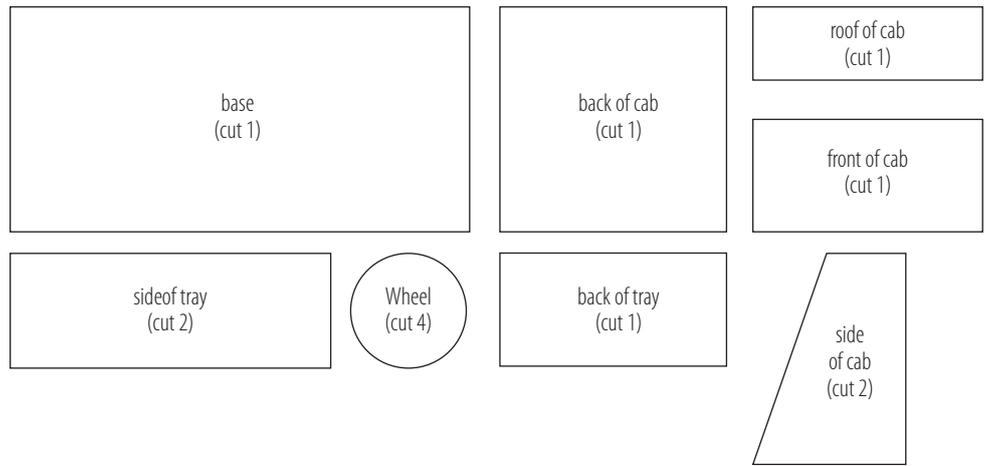
PROJECT 3 Product design (continued)

Core project 3b A toy truck

This truck is made from wood.



The pieces needed to be cut are shown below at $\frac{1}{5}$ of their actual size.



1. Calculate the actual area of each piece of wood used for the truck.
What is the total area of wood used?
2. What other materials would you need to make the truck?
3. What tools would you need to make the truck?
4. What special precautions would you need to take if you were making the truck for a young child?

Optional project 3c Your own design

Design an item of your own choice and calculate the amount and cost of materials needed to make the item.

1. Make a scale drawing showing the pattern pieces and how they should be cut out.
2. Draw up a complete list of all the materials required to complete the project (include sizes and amounts).
3. Work out an estimate of the costs together with actual costs.
4. Draw up a list of tools you will need.

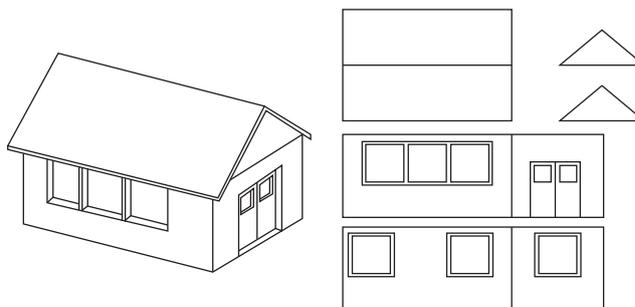
Some ideas you could try are a laundry bag, pillow sleeves or a letter box.

Optional project 3d A scale model

Select a building or structure within the school grounds from which to construct a scale model.

You will need a tape measure, trundle wheel, square grid paper, stiff card, scissors and sticky tape.

1. Make sketches of the structure from all sides, and draw a plan.
2. Make the necessary measurements, and mark them on your sketches.
3. Choose an appropriate scale, and construct scale drawings of all sides of the structure (front, back, left side, right side and top).
4. Cut out the pieces and make a test model. If everything looks correct, transfer the shapes onto the card and make the model. You might be able to put some of the pieces side by side on the card to reduce the number of joins. (This is like making a net of a solid.)



Do the following if your test model does not look right.

- Check that you have calculated the lengths correctly according to the scale you have chosen.
- Check that the original measurements you made were accurate.
- Ask your teacher for help.

PROJECT 4

A school survey

Work in groups.

The skills you have developed throughout Grade 10 will enable you to conduct your own survey.

Guidelines

- You should collect approximately 30 results. The data you collect must be numerical data. (Why?)
- Use appropriate techniques to collect, organise, display and summarise the data.

Techniques should include:

- surveying or measuring to collect the data, considering whether a sample or census is appropriate, and if you select a sample, ensuring that it is representative
- a dot plan or stem-and-leaf plot and frequency distribution table to organise the data
- a histogram or polygon to display the data
- the calculation of the mean, median and mode to summarise the data.

1. Read the information about HIV/Aids below.
2. Conduct a survey in your school or community to find out how many children are affected in this way by HIV/Aids.
3. Write a report on your investigation, including any of the features above, with your own comments on the results. Were the results as you expected? Are the data you collected reliable and representative? What conclusions can you draw from your results?
4. Prepare a short oral presentation to be given to the class. Ensure that your graphs are clear enough for everyone to see them.
5. Write a proposal to your provincial government suggesting how it can help children who are affected by HIV/Aids, based on the findings of your survey.

HIV and Aids are sensitive issues, therefore approach this investigation with care. Also remember that the HIV status of a person is confidential.

HIV/Aids in your community

SOUTH AFRICA faces an HIV/Aids pandemic. An estimated 5,5 million people in South Africa have HIV/Aids, and many more are affected by Aids – they may have a relative or know somebody who has Aids. Many children have lost their parents through HIV and Aids and are alone. Children on the Brink 2002, a joint report on orphan estimates and programme strategies by UNAIDS (a joint United Nations Programme on HIV/Aids) and UNICEF

(United Nations Children’s Fund) states that “more than 20 million people around the world have died from the disease. An estimated 40 million are living with HIV today, including almost 3 million children under the age of 15. One of the most telling and troubling consequences of the epidemic’s growing reach is the number of children it has orphaned or seriously affected. Today more than 13 million children currently under the age of 15 have lost one or both parents to Aids, most of them in sub-Saharan Africa.”

You may prefer to choose your own topic. If so, check with your teacher first to make sure it will produce suitable results.

PROJECT 5

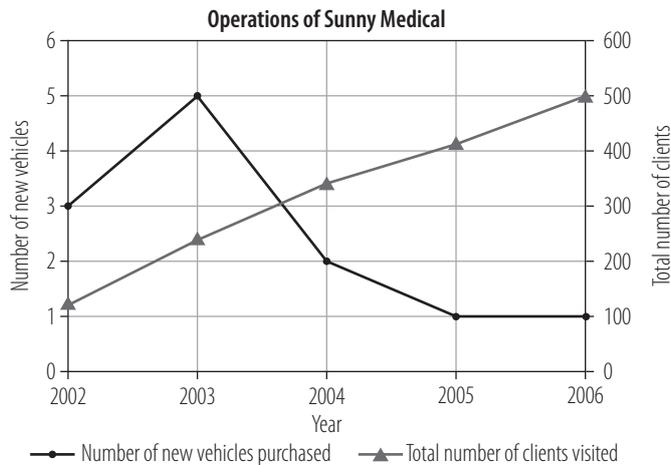
Critique data

Do part A of this project on your own. Work in small groups for part B.

Part A

The compound line graph below shows information about a medical supply firm, Sunny Medical. The manager of the firm, Mr Kwemba, presents this graph at a meeting to show how well the company is doing.

Mr Kwemba explains how the number of new cars purchased over the five years shown has decreased, but the total number of clients of the firm has increased over the same period. He says that the firm is doing well. Mr Kwemba hopes that he will be promoted as a result of his explanation.



The table below shows the data from which Mr Kwemba drew the graph.

Year	2002	2003	2004	2005	2006	Total
Number of vehicles purchased	3	5	2	1	1	13
Number or new clients	118	121	103	71	95	508

1. Explain how Mr Kwemba calculated the values for the total number of clients on the graph.
2. Do you think Mr Kwemba has accurately shown what is happening at Sunny Medical? Explain your answer.
3. Redraw the graph by using the information from the table. Write a short paragraph on the performance of Sunny Medical over these five years.
4. If you were Mr Kwemba's boss, would you promote him? Why, or why not?

Include your answers for this part when you submit your project for assessment.

Part B

Choose one of the two options below.

- Gather two or three articles or advertisements from a newspaper or magazine that represent the data in some way. The articles could include tables or graphs. Advertisements for food supplements, cosmetics or personal loans are usually suitable.

- Gather some data from your class in the form of a quick survey or questionnaire. The data could be opinions of under-age drinking, the date of your school social, the amount of homework you get, or another suitable topic. (Check your topic with your teacher first.)
1. If you have gathered articles, look closely at the data. Comment on the way the data have been presented and whether it has been done in a way that might be misleading. In your comments, include answers to questions such as the following.

a.	Who is the information aimed at?
b.	What impression do the writers want to create?
c.	Do you think the writers have misled people on purpose?
d.	Why do the writers want to mislead people in this way?
 2. If you have gathered data from your class, present the data in two different ways:
 - a.** as if you were in favour of the results
 - b.** as if you were not in favour of the results.

You may do this in any way you like, by drawing graphs in various ways, by using tables or by giving statistical facts. Always remember that you cannot change any of the data. In your presentation, include a short paragraph on how the data you gathered support your point of view.

B. Multiplication tables

The 1 times table

$$\begin{aligned}1 \times 1 &= 1 \\2 \times 1 &= 2 \\3 \times 1 &= 3 \\4 \times 1 &= 4 \\5 \times 1 &= 5 \\6 \times 1 &= 6 \\7 \times 1 &= 7 \\8 \times 1 &= 8 \\9 \times 1 &= 9 \\10 \times 1 &= 10 \\11 \times 1 &= 11 \\12 \times 1 &= 12\end{aligned}$$

The 4 times table

$$\begin{aligned}1 \times 4 &= 4 \\2 \times 4 &= 8 \\3 \times 4 &= 12 \\4 \times 4 &= 16 \\5 \times 4 &= 20 \\6 \times 4 &= 24 \\7 \times 4 &= 28 \\8 \times 4 &= 32 \\9 \times 4 &= 36 \\10 \times 4 &= 40 \\11 \times 4 &= 44 \\12 \times 4 &= 48\end{aligned}$$

The 2 times table

$$\begin{aligned}1 \times 2 &= 2 \\2 \times 2 &= 4 \\3 \times 2 &= 6 \\4 \times 2 &= 8 \\5 \times 2 &= 10 \\6 \times 2 &= 12 \\7 \times 2 &= 14 \\8 \times 2 &= 16 \\9 \times 2 &= 18 \\10 \times 2 &= 20 \\11 \times 2 &= 22 \\12 \times 2 &= 24\end{aligned}$$

The 5 times table

$$\begin{aligned}1 \times 5 &= 5 \\2 \times 5 &= 10 \\3 \times 5 &= 15 \\4 \times 5 &= 20 \\5 \times 5 &= 25 \\6 \times 5 &= 30 \\7 \times 5 &= 35 \\8 \times 5 &= 40 \\9 \times 5 &= 45 \\10 \times 5 &= 50 \\11 \times 5 &= 55 \\12 \times 5 &= 60\end{aligned}$$

The 3 times table

$$\begin{aligned}1 \times 3 &= 3 \\2 \times 3 &= 6 \\3 \times 3 &= 9 \\4 \times 3 &= 12 \\5 \times 3 &= 15 \\6 \times 3 &= 18 \\7 \times 3 &= 21 \\8 \times 3 &= 24 \\9 \times 3 &= 27 \\10 \times 3 &= 30 \\11 \times 3 &= 33 \\12 \times 3 &= 36\end{aligned}$$

The 6 times table

$$\begin{aligned}1 \times 6 &= 6 \\2 \times 6 &= 12 \\3 \times 6 &= 18 \\4 \times 6 &= 24 \\5 \times 6 &= 30 \\6 \times 6 &= 36 \\7 \times 6 &= 42 \\8 \times 6 &= 48 \\9 \times 6 &= 54 \\10 \times 6 &= 60 \\11 \times 6 &= 66 \\12 \times 6 &= 72\end{aligned}$$

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 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 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 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 9 times table

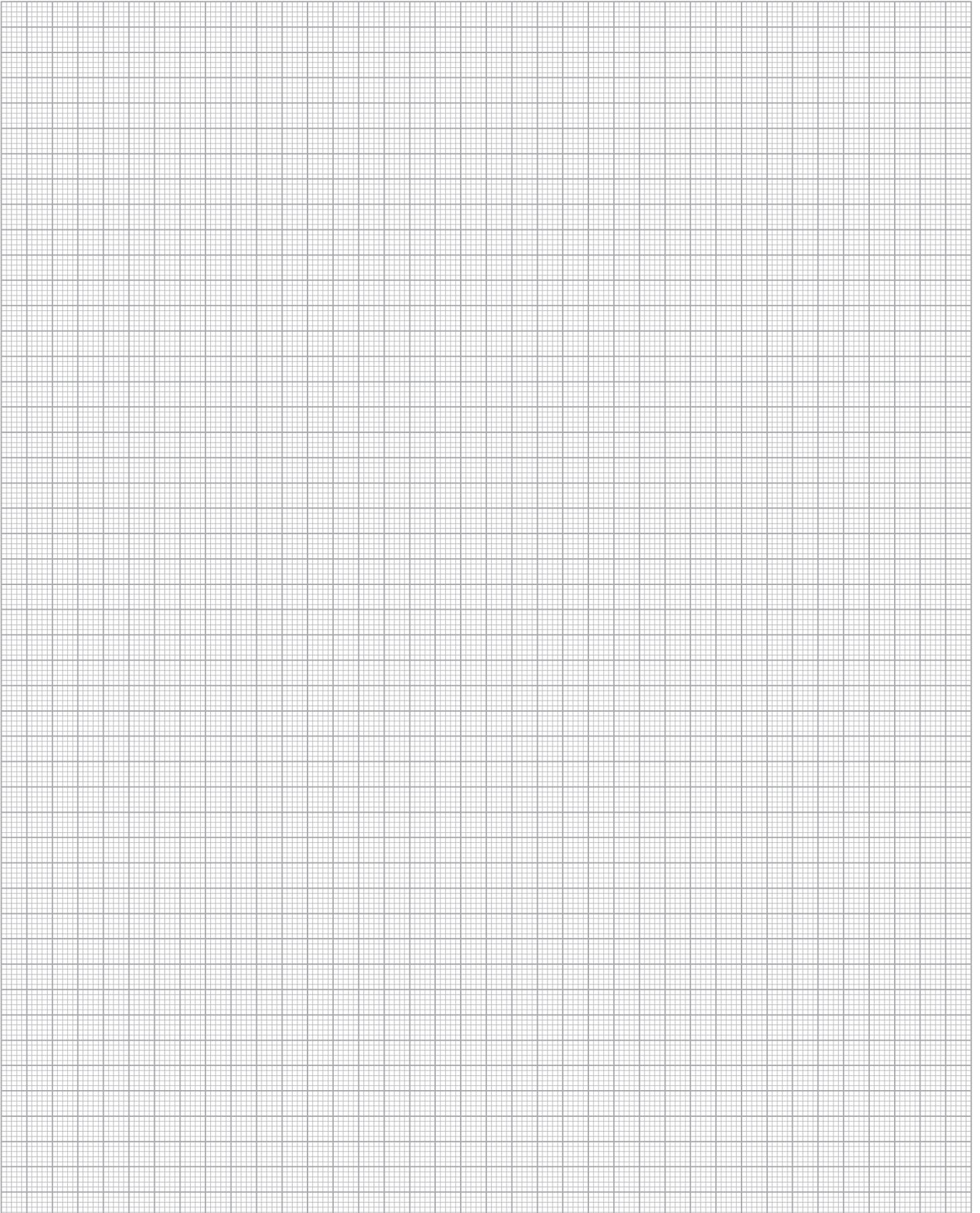
$$1 \times 9 = 9$$
$$2 \times 9 = 18$$
$$3 \times 9 = 27$$
$$4 \times 9 = 36$$
$$5 \times 9 = 45$$
$$6 \times 9 = 54$$
$$7 \times 9 = 63$$
$$8 \times 9 = 72$$
$$9 \times 9 = 81$$
$$10 \times 9 = 90$$
$$11 \times 9 = 99$$
$$12 \times 9 = 108$$
The 12 times table

$$1 \times 12 = 12$$
$$2 \times 12 = 24$$
$$3 \times 12 = 36$$
$$4 \times 12 = 48$$
$$5 \times 12 = 60$$
$$6 \times 12 = 72$$
$$7 \times 12 = 84$$
$$8 \times 12 = 96$$
$$9 \times 12 = 108$$
$$10 \times 12 = 120$$
$$11 \times 12 = 132$$
$$12 \times 12 = 144$$

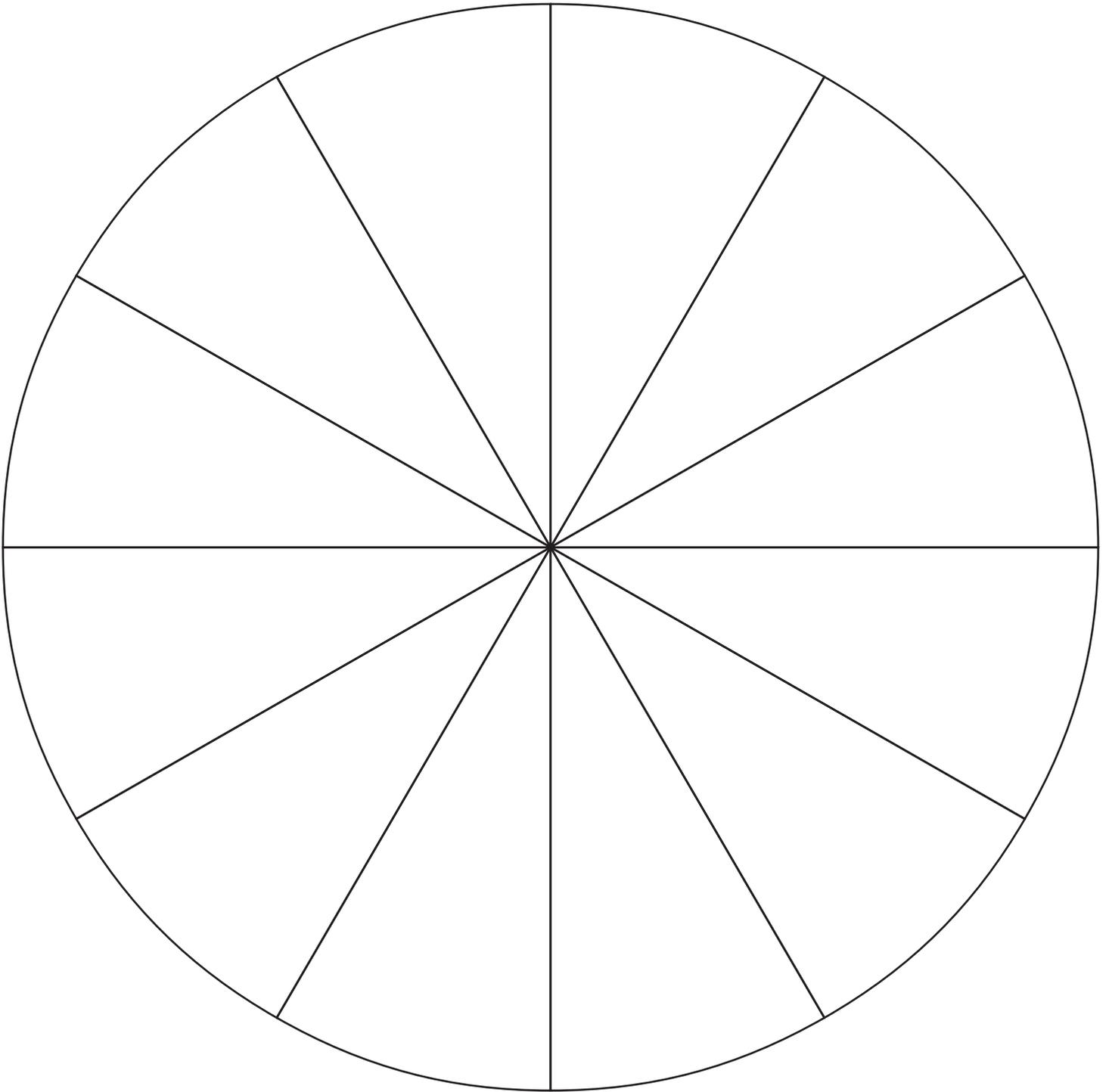
TIMES TABLES
Quick reference chart

×	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

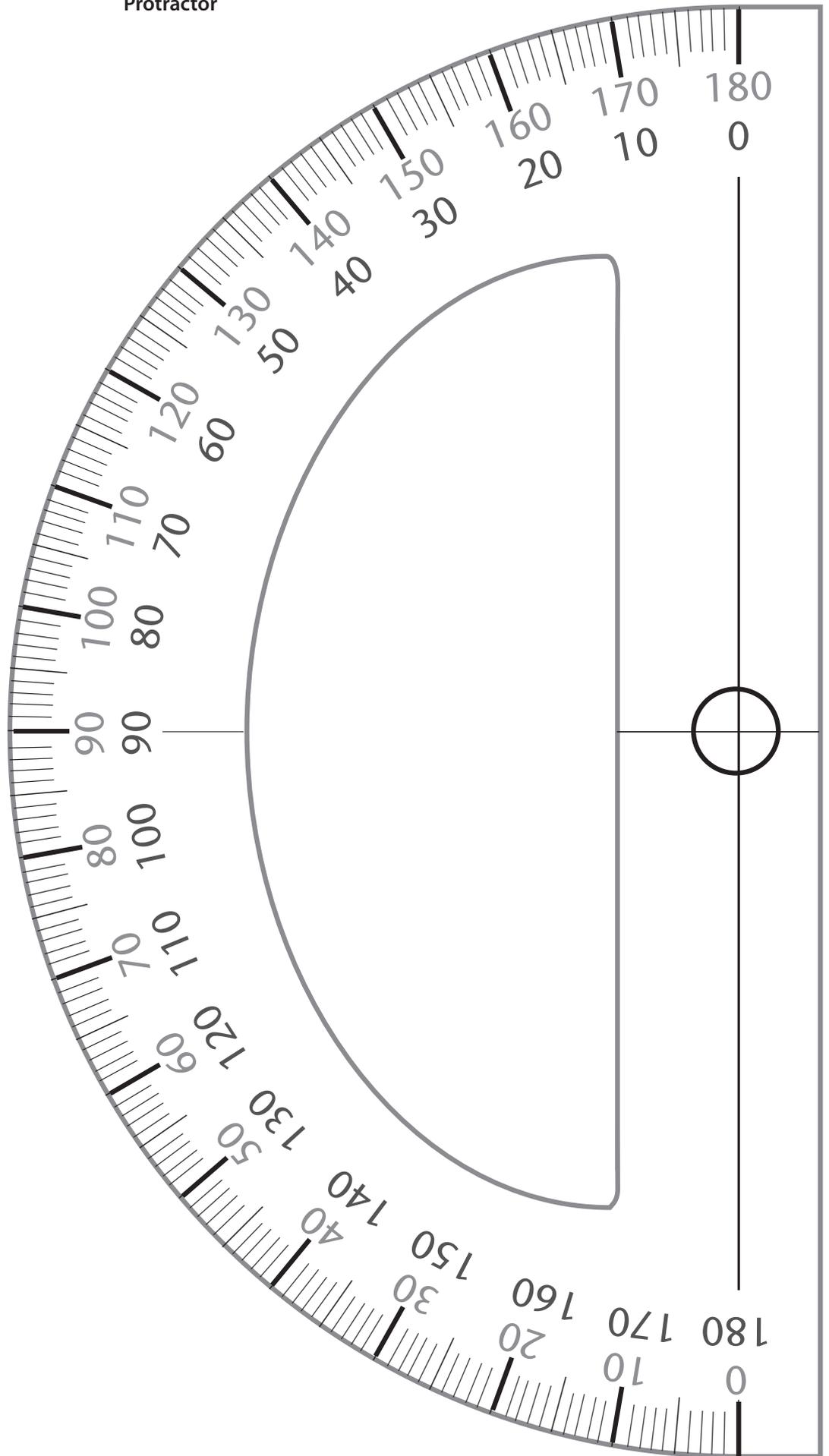
Graph paper



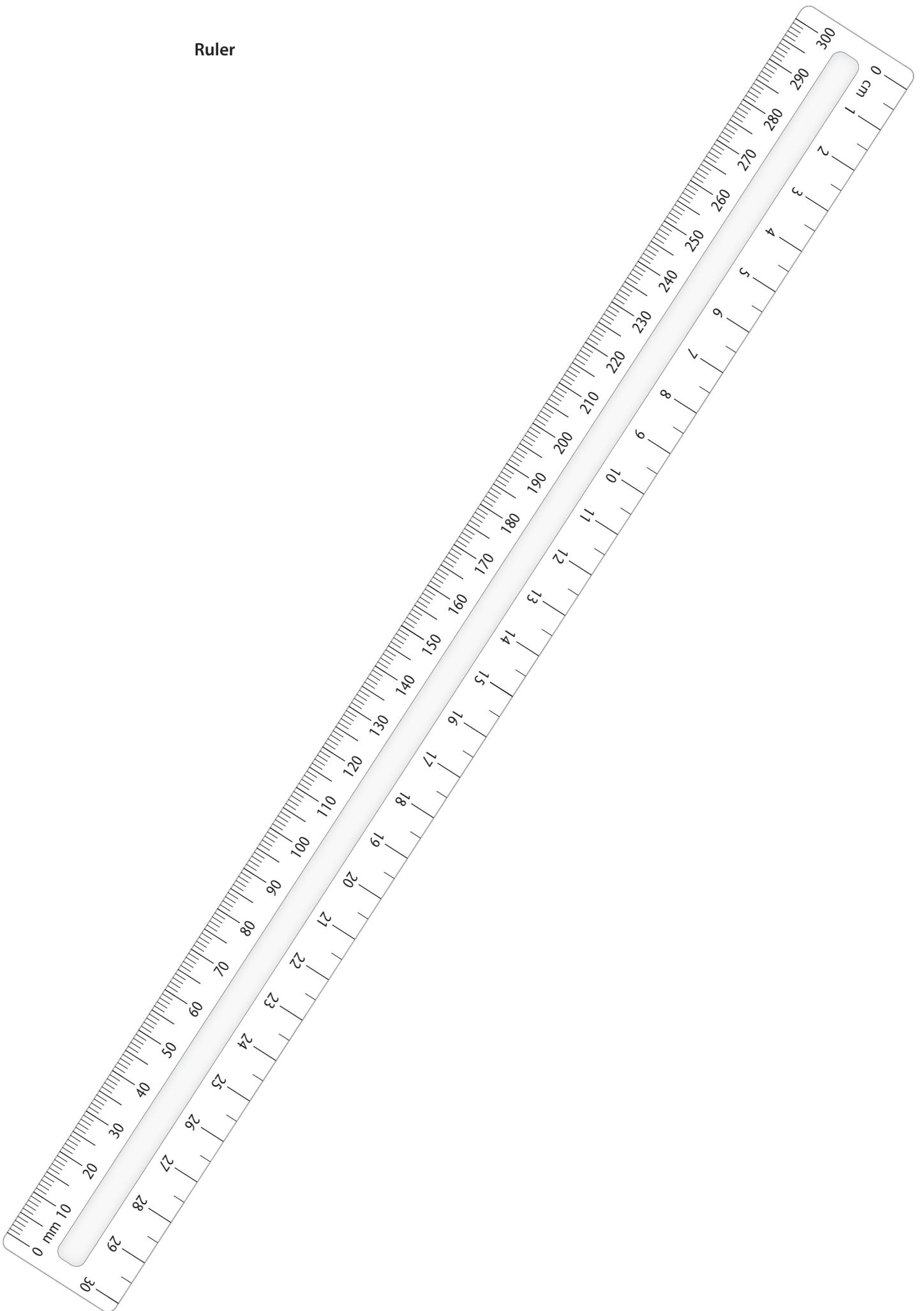
Pie chart



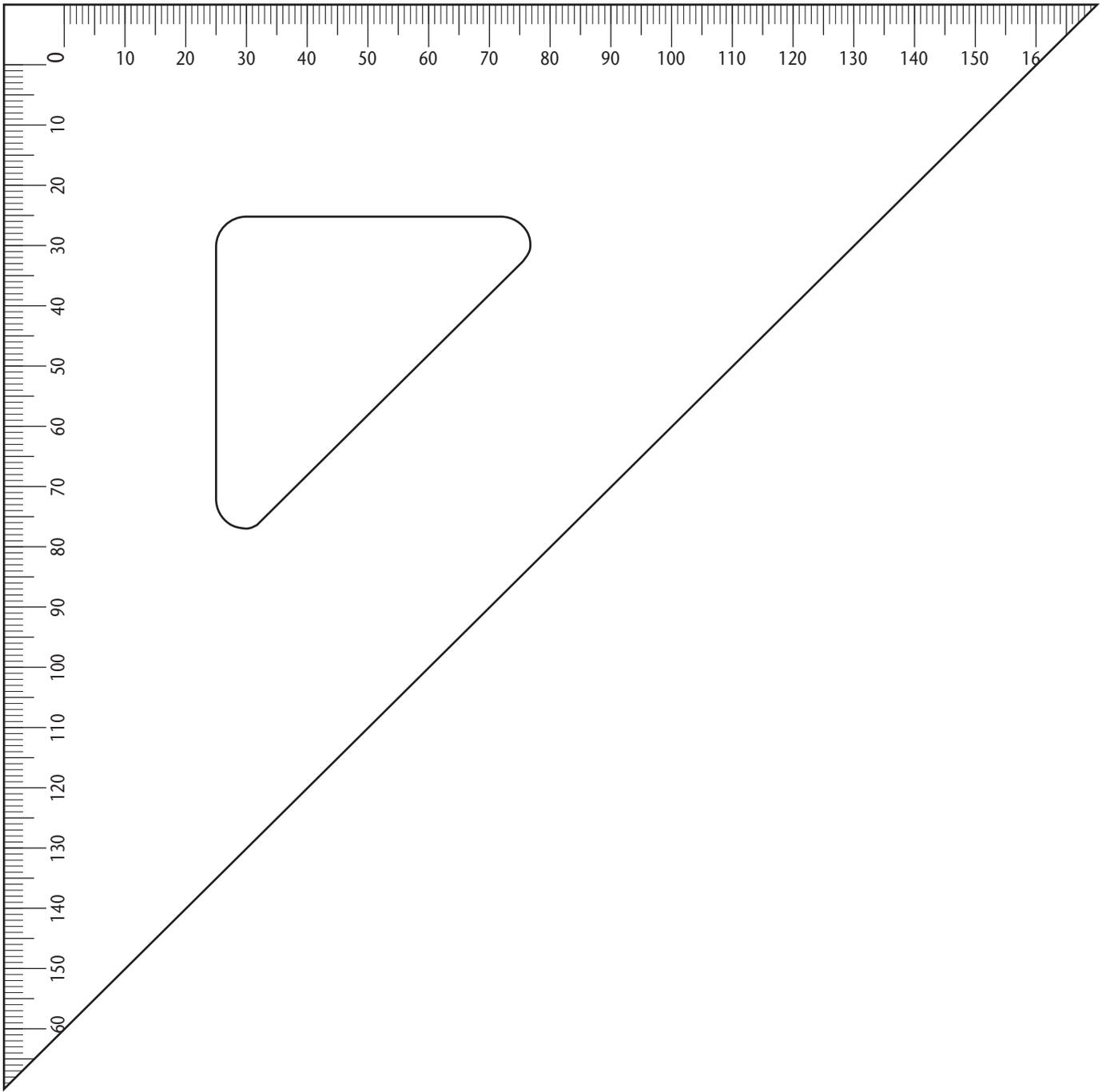
Protractor



Ruler



Set square



	SECTION 5	
	DOCUMENTS	

Add your own notes and documents, for example the CAPS document for *Mathematical Literacy*, here.



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