learnXtra

MATHS LITERACY
GRADE 12

exam school

2012

CONTENTS

INTRODUCTION

Have you heard about Mindset? Mindset Network, a South African non-profit organisation, was founded in 2002. We develop and distribute quality and contextually relevant educational resources for use in the schooling, health and vocational sectors. We distribute our materials through various technology platforms like TV broadcasts, the Internet (www.mindset.co.za/learn) and on DVDs. The materials are made available in video, print and in computer-based multimedia formats.

At Mindset we are committed to innovation. In the last three years, we have successfully run a series of broadcast events leading up to and in support of the Grade 12 NSC examinations

Now we are proud to announce our 2012 edition of Exam School. From 15th October till 20th November will bring you revision lessons in nine subjects - Mathematics, Physical Sciences, Life Sciences, Mathematical Literacy, English 1st Additional Language, Accounting, Geography, Economics and Business Studies.

In this exam revision programme we have selected Questions mainly from the Nov 2011 Papers and have tried to cover as many topics as we can. Each topic is about an hour long and if you work through the selected questions you will certainly have increased confidence to face your exams. In addition to the topics and questions in this booklet, we have schedule 1½ hour live shows a day or two before you write your exams. To get the most out of these shows, we need you to participate by emailing us questions, calling in or posting on twitter, peptxt or facebook.

Since you asked us for late night study sessions and that's what we've planned! You'll find repeats of our Live shows at 10:30pm every evening. Then from midnight to 6:00 am there are revision lessons too. So if you can't watch during the day, you can record or watch early in the morning! .

GETTING THE MOST FROM EXAM SCHOOL

You must read this booklet! You'll find the exam overviews and lots of study tips and hints here. in Start your final revision by working through the questions for a topic fully without looking up the solutions. If you get stuck and can't complete the answer don't panic. Make a note of any questions you have. Now you are ready to watch a Learn Xtra session. When watching the session, compare the approach you took to what the teacher does. Don't just copy the answers down but take note of the method used. Also make a habit of marking your work by checking the memo. Remember, there are usually more than one way to answer a question.If you still don't understand post your question on Facebook – you'll get help from all the other Mindsetters on the page. You can also send an email to helpdesk@learnxtra.co.za and we'll get back to you within 48 hours.

Make sure you keep this booklet. You can re-do the questions you did not get totally correct and mark your own work. Exam preparation requires motivation and discipline, so try to stay positive, even when the work appears to be difficult. Every little bit of studying, revision and exam practice will pay off. You may benefit from working with a friend or a small study group, as long as everyone is as committed as you are.

We are pleased to announce that we'll continue to run our special radio broadcasts on community radio stations in Limpopo, Eastern Cape and KZN. This programme is called MTN Learn. Find out more details at www.mtnlearning.co.za. You can also listen online or download radio broadcasts of previous shows. Tuning into radio will give you the chance to learn extra! Look out for additional notes in Newspaper supplements too.

Mindset believes that the 2012 Learn Xtra Spring School will help you achieve the results you want. All the best to the Class of 2012!

CONTACT US

We want to hear from you. So let us have your specific questions or just tell us what you think through any of the following:

	LearnXtra		helpdesk@learnxtra.co.za
	@learnxtra		086 105 8262
	www.learnxtra.co.za		Mindset *Get the free app at pepclub.mobi*

BROADCAST SCHEDULES

EXAM SCHOOL (DSTV AND TOPTV 319)

DATE	TIMES	TOPICS
31 October	*09:00 – 10:00*	*Working with Numbers*
	10:00 – 11:00	*Finance Calculations*
	11:00 – 12:00	*Mapwork*
	12:00 – 13:00	*Working with Graphs*
	13:30 – 14:30	*Data Handling*
	14:30 – 15:30	*Perimeter Area & Volume*
	15:30 – 17:00	*Live*
	22:30 – 00:00	*Live: (Repeat)*
01 November	*00:00 – 01:00*	*Working with Numbers*
	01:00 – 02:00	*Finance Calculations*
	02:00 – 03:00	*Mapwork*
	03:00 – 04:00	*Working with Graphs*
	04:00 – 05:00	*Data Handling*
	05:00 – 06:00	*Perimeter Area & Volume*
02 November	*17:00 – 18:00*	*Perimeter Area & Volume*
	18:00 – 19:00	*Mapwork*

03 November	09:00 – 10:00	*Working with Numbers*
	10:00 – 11:00	*Finance Calculations*
	11:00 – 12:00	*Mapwork*
	12:00 - 13:00	*Working with Graphs*
	13:30 – 14:30	*Data Handling*
	14:30 – 15:30	*Perimeter Area & Volume*
	15:30 – 17:00	*Live*
	17:00 – 18:00	*Finance Calculations*
	18:00 – 18:00	*Working with Graphs*
	22:30 – 00:00	*Live: (Repeat)*
04 November	00:00 – 01:00	*Data Handling*
	01:00 – 02:00	*Perimeter Area & Volume*
	02:00 – 03:00	*Working with Numbers*
	03:00 – 04:00	*Finance Calculations*
	04:00 – 05:00	*Mapwork*
	05:00 – 06:00	Working with Graphs

PREPARING FOR EXAMINATIONS

1. Prepare well in advance for all your papers and subjects. You need to start your planning for success in the final examination now. You cannot guarantee success if you only study the night before an exam.

2. When studying don't just read through your notes or textbook. You need to be active by making summary checklists or mind maps. Highlight the important facts that you need to memorise. You may need to write out definitions and formulae a few times to make sure you can remember these. Check yourself as often as you can. You may find it useful to say the definitions out aloud.

3. Practise questions from previous examination papers. Follow these steps for using previous exam papers effectively:
   - Take careful note of all instructions - these do not usually change.
   - Try to answer the questions without looking at your notes or the solutions.
   - Time yourself. You need to make sure that you complete a question in time. To work out the time you have, multiply the marks for a question by total time and then divide by the total number of marks. In most exams you need to work at a rate of about 1 mark per minute.
   - Check your working against the memo. If you don't understand the answer given, contact the Learn Xtra Help desk (email: helpdesk@learnxtra.co.za).
   - If you did not get the question right, try it again after a few days.

4. Preparing for, and writing examinations is stressful. You need to try and stay healthy by making sure you maintain a healthy lifestyle. Here are some guidelines to follow:
   - Eat regular small meals including breakfast. Include fruit, fresh vegetables, salad and protein in your diet.
   - Drink lots of water while studying to prevent dehydration.

- Plan to exercise regularly. Do not sit for more than two hours without stretching or talking a short walk.
- Make sure you develop good sleeping habits. Do not try to work through the night before an exam. Plan to get at least 6 hours sleep every night.

EXAM TECHNIQUES

1. Make sure you have the correct equipment required for each subject. You need to have at least one spare pen and pencil. It is also a good idea to put new batteries in your calculator before you start your prelims or have a spare battery in your stationery bag.

2. Make sure you get to the exam venue early - don't be late.

3. While waiting to go into the exam venue, don't try to cram or do last minute revision. Try not to discuss the exam with your friends. This may just make you more nervous or confused.

4. Here are some tips as to what to do when you receive your question papers:
   Don't panic, because you have prepared well.

   - You are always given reading time before you start writing. Use this time to take note of the instructions and to plan how you will answer the questions. You can answer questions in any order.
   - Time management is crucial. You have to make sure that you answer all questions. Make notes on your question paper to plan the order for answering questions and the time you have allocated to each one.
   - It is a good idea always to underline the key words of a question to make sure you answer it correctly.
   - Make sure you look any diagrams and graph carefully when reading the question. Make sure you check the special answer sheet too.
   - When you start answering your paper, it is important to read every question twice to make sure you understand what to do. Many marks are lost because learners misunderstand questions and then answer incorrectly.
   - Look at the mark allocation to guide you in answering the question.
   - When you start writing make sure you number your answers exactly as they are in the questions.
   - Make sure you use the special answer sheet to answer selected questions.
   - Think carefully before you start writing. It is better to write an answer once and do it correctly than to waste time rewriting answers.
   - DO NOT use correction fluid (Tippex) because you may forget to write in the correct answer while you are waiting for the fluid to dry. Rather scratch out a wrong answer lightly with pencil or pen and rewrite the correct answer.
   - Check your work. There is usually enough time to finish exam papers and it helps to look over your answers. You might just pick up a calculation error.

MATHEMATICAL LITERACY EXAM OVERVIEW

PAPER 1		PAPER 2	
3 hours	**150 marks**	**3 hours**	**150 marks**
Calculation skills (calculator usage) - Units (cm, mm, ℓ etc) 2 decimal for money - Substitution **[±25 marks]**		Personal business & finance - Vat, add, % etc - Budget - Taxi business, tuck shop etc **[±25 marks]**	
Graphs - Reading from graphs - Interpret and calculations - Drawing of pie, histogram, compound bar & line graphs **[±30 marks]**			
Tables Add, subtract, % etc **[±20 marks]**			
Statistics Mean – average Mode – item appearing most often Median – Middle item when data is organized **[±25 marks]**		range – highest subtract lowest quartiles and percentiles	
Areas, volumes & perimeter Read and substitute		**[±25 marks]**	
Locations and grids (Map work) - Directions - Convert **[±15 marks]**			
Probability tossing the coin, dice landing with 4 facing up etc. **[±10 marks]**		Probability - tree diagrams - event, outcome, probability **[±25 marks]**	

Paper 1: A basic knowing and routine applications paper

There could be 5 – 8 questions
- Question 1 could contain some basic calculations and simple short questions.
- Question 2 could contain simple short context questions divided into sub-questions.
- Questions 3 – 6 (Long questions)
  Each question should be set on a different context.
  Each context should contain questions from at least two different Learning Outcomes.

Paper 2: An applications, reasoning and reflecting paper

There could be 4 – 6 longer questions
- No basic calculations (Knowing questions)
- Each question should be set on a different context.
- Each context should contain questions from at least two different Learning Outcomes.
- 30 – 40 marks on each Learning Outcome

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WORKING WITH NUMBERS

STUDY NOTES

1. Calculator Skills

- When performing multi-step calculations, do not round off until you have the final answer.
- If there are brackets in the calculation, enter them in exactly the same place using the bracket button on the calculator.
- Use estimation, where possible, to check your calculator work.
- Think about it – Does your answer look right.

2. BODMAS

BODMAS is the simple order in which to solve a Maths problem.

B	- Brackets first
O	- Of
D	- Division
M	- Multiplication
A	- Addition
S	- Subtraction

3. Percentages

Definition:

A percentage is a portion of a whole, where the whole is one hundred. Every percentage is then a fraction out of 100 (the whole). It is for this reason that we write a percentage as a fraction with a denominator of 100.

E.g. 40% is shorthand for $\frac{40}{100}$ or 0,40

Percentage has been adopted quite comfortably into day to day language because:

- People find it easier to visualize / comprehend percentage than actual amounts. For example one would have a better sense of how popular a candidate was if you heard "Karen got 70% of the votes" compared with "Karen got 4 389 of the 6 270 votes cast".

- It makes comparisons easier. For example, people find it easier to make sense of the statement: "37,5% of the population got ill this year in comparison with 44,4% last year" than they would the statement: "$\frac{3}{8}$ of the population got ill this year in comparison with $\frac{4}{9}$ last year"

When dealing with percentage, below are five different types of questions you may be asked.

a)   If given an amount to find out how much of the total the amount is in %:
b)   If given the percentage to find out the new total:

c)   If given the new amount to find out the original amount:
d)   If given two amounts to find the % increase or decrease:

New amount **–** initial amount   x   100
                  Initial Amount   1

e)   If given the percentage to convert into a common fraction:

4. Rounding off Decimals

Rounding off numbers can be to a specific decimal or to a required significant figure.

Rule: If the number is to be rounded off to the second decimal place, then take the number to be rounded off and underline the digit in the second decimal place. If the number to the right of the underlined digit is 5, 6, 7, 8, 9 you will then increase the underlined number by 1 and remove the rest of the number. This is **rounding up**.   Example: 52,5<u>8</u>64 = 52,59

If the number to the right of the underline digit is 0, 1, 2, 3, 4, you will leave the underlined digit as is and remove the rest of the number. E.g.: 52,5<u>2</u>35 = 52,52. This is called **rounding down**.

Context is the most important element to consider. It is not always realistic to simply apply the mathematical rules for rounding off. Example: If the question is "How many bricks do you need to buy?" and you calculate the answer to be 10,2, then your final answer would need to be 11. If you bought only 10 bricks you would not have enough. Even though you will have some part of a brick left over, it is necessary to buy 11 bricks.

WORKING WITH NUMBERS QUESTIONS

Question 1*(Adapted from Nov 2011, Paper 1, Question 1)*

1.1 Simplify: 241,50 (124,37 – 121,79) + $\sqrt{232,5625}$ (2)

1.2 Without rounding off, convert 25,5 centimetres to metres.   (2)

1.3 How many eggs are there in a tray containing 2 dozen eggs?   (2)

1.4 Determine the time 2 hours and 7 minutes after 22:57.   (2)

1.5 Determine the length of ONE side of a square if the perimeter is 36 m.   (2)

1.6 If 9 February 2011 is a Wednesday, determine the probability that 26 February 2011 will be a
       Saturday.   (2)

Question 2 (*Adapted from Feb/Mar 2011, Paper 2, Question 1.1*)

Mrs James, the principal of Vuka High School, conducted a survey amongst all the learners at her school. In one of the questions all the learners were asked the time (to the nearest minute) that they usually took to travel to school each day.The responses to this question are shown in the table below:

TABLE 1: Time usually taken by all the learners of Vuka High School to travel to school each day

Time taken in minutes	0 to less than 10	10 to less than 20	20 to less than 30	30 to less than 40	40 to less than 50	50 to less than 60	60 to less than 70	70 to less than 80
Number of learners	195	340	185	280	90	30	75	**B**
% of learners	15,6	27,2	**A**	22,4	7,2	2,4	6,0	4,4

2.1 Calculate the missing values:

   (a) A   (2)

   (b) B   (3)

2.2 What percentage of the learners take 40 minutes or more to travel to school?   (2)

Question 3 *(Adapted from Nov 2011, Paper 1, Question 2.2)*

South Africa has nine provinces, which vary in size. The pie charts below show the percentage land area per province and the total population distribution per province.
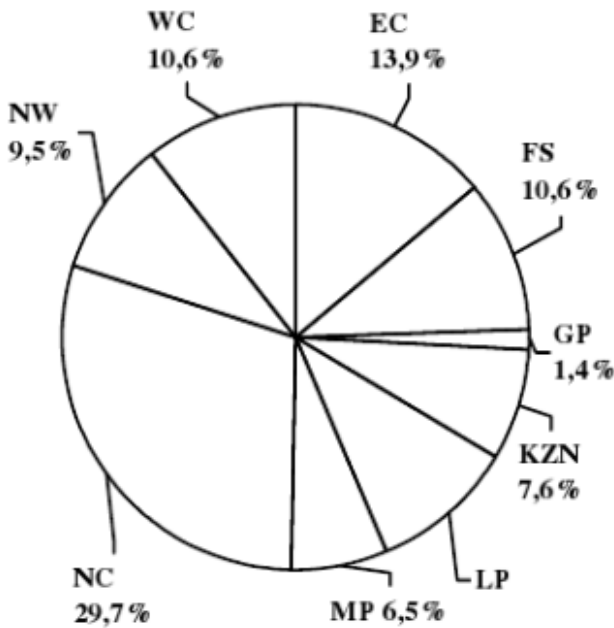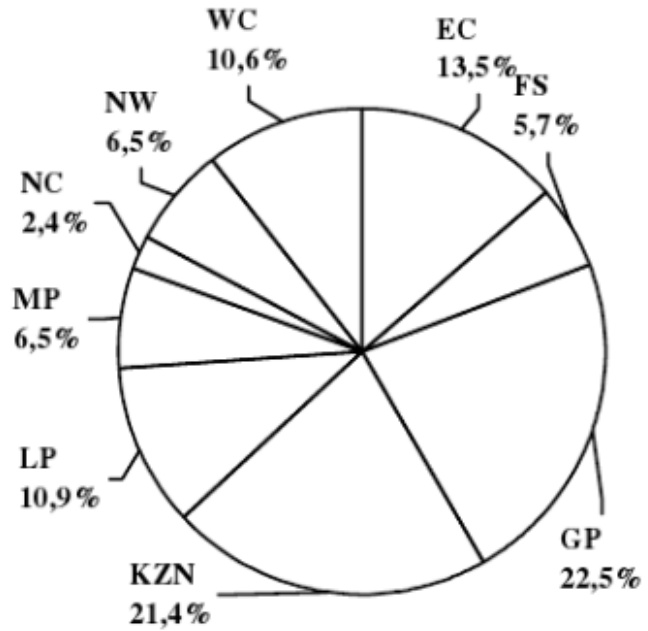
CHART A: LAND AREA

CHART B: POPULATION DISTRIBUTION

KEY for the pie charts above:

SYMBOL	PROVINCE	SYMBOL	PROVINCE
EC	Eastern Cape	FS	Free State
GP	Gauteng	KZN	KwaZulu-Natal
LP	Limpopo	MP	Mpumalanga
NC	Northern Cape	NW	North West
WC	Western Cape		

3.1 Which province has the largest land area but the smallest population? (1)

3.2 Which provinces occupy the same percentage land area? (2)

3.3 Which province(s) have the same percentage on both charts? (2)

3.4 Calculate the percentage land area for Limpopo. (2)

3.5 Calculate South Africa's total population if the population of North West was 3 249 415. (3)

Question 4 *(Adapted from Nov 2011, Paper 1, Question 6.1)*

The Golden Girls Hockey Club qualified to play in the Wilken Cup Final. In an attempt to encourage her team to score as many goals as possible, the owner of the club developed the following bonus options as an incentive:

OPTION A:

Each player will receive a basic bonus of R4 600 per game plus an extra R250 for each goal scored by the team.

This can be written as: **OPTION A = R4 600 + R250 × number of goals scored**

OPTION B:

Each player will receive a basic payment of R4 000 per game plus an extra R400 for each goal scored by the team.

This can be written as: **OPTION B = R4 000 + R400 × number of goals scored**

TABLE 4 below shows the total bonus that each team member could receive based on the number of goals scored.

TABLE 4: Total bonus payments for each player

Number of goals scored	0	2	4	Q	7	8
OPTION A (in rand)	4 600	P	5 600	6 100	6 350	6 600
OPTION B (in rand)	4 000	4 800	5 600	6 400	6 800	7 200

4.1 Calculate the missing values P and Q. (4)

4.2 Answer the following questions:

(a) Using OPTION B, how much money will each player receive if the team does not score any goals in the final match? (1)

(b) Using OPTION A, how many goals did the team score in the final match if the owner paid each player R6 350? (2)

(c) Suppose the team scored 5 goals. Which payment option would give the players the most money? (2)

FINANCE CALCULATIONS

STUDY NOTES

INCOME
The money a business receives. Sources of income can be fixed – like an agreed rental or variable – like cash received from sales

EXPENDITURE
The money a business pays out. Expenditure can be fixed – like salaries or variable – like cost of fuel or electricity

PROFIT / LOSS / BREAKEVEN
The goal of every business is to make the maximum profit. We calculate profit as follows:

Profit = Income – Expenses

- If the income is more than the expenses, the business makes a profit.
- If the income is less than the expenses, the business makes a loss.
- If the income is exactly the same as the expenses, the business breaks even.

TAX
The government tries to supply its citizens with many items such as infrastructure (roads, electricity, water, etc), health care, an education system, security and safety. The money needed for these projects comes from the people themselves. We pay for these services by paying taxes.

VAT – VALUE ADDED TAX
During the process of production of a consumer good, each production process adds some value to that product. A percentage of the value that is added is taxed, i.e. payable to the government, at the moment when the product is bought and sold again. In South Africa we pay 14% VAT on most consumer goods. This process ensures that everyone in the country contributes to the infrastructure they make use of on a daily basis. To determine the portion of VAT for a specific product we use percentage calculations.

There are a list of goods and services are zero-rated for VAT. These include brown bread, maize meal, rice, fruit and vegetables, milk eggs petrol and diesel.

INCOME TAX
Every person in South Africa who is employed and earns a certain minimum amount, has to pay tax on his or her income. The tax on income is calculated as a percentage of the income.

Make sure you understand how to read a tax table. You also need to know what a rebate is.

INFLATION

A basket of goods is chosen by statisticians. The price of this basket is recorded every month for a year. The rate of inflation is the percentage that the basket of goods has increased or decreased in price over the year.

EXCHANGE RATES AND FOREIGN EXCHANGE

An exchange rate is the price of one nation's currency in terms of another nation's currency. This means that it is a measure of the strength of one currency against another.

The newspaper reports every day on the state of our currency in regards to other currencies. They may report that the 'rand is R8,55 to the dollar'. This means that for every dollar you want to 'buy' you have to pay R8,55.

INTEREST

Whenever a person buys something on credit or takes a loan, the bank charges them interest. When you invest money in the bank, the bank pays you interest. There are two types of interest; **simple and compound**.

- **Simple interest** is calculated only on the actual, initial value of the amount borrowed.
- **Compound interest** is calculated on the actual, initial value plus interest on the interest at a specific point in time.

Simple Interest

The value of the interest is calculated using the original amount invested or borrowed.

The **formula** for calculating the **total value** of an investment for **simple interest** is:

$$A = P(1 + r)n$$

Where,

- A is the **total value** of the investment or loan at the **end of the period**
- P is the **initial amount** invested or borrowed
- r is the **interest rate** for the payment interval
- n is the **number of payment intervals** over the total period of the loan or investment

If we wish to calculate only the **interest amount** over the entire period, we use the following formula: **SI = P.r.n**   where SI = Simple interest

Compound Interest

The formula for compound interest:

$$A = P(1 + r)^n$$

Where,

* ✶ A is the total value of the **investment or loan at the end** of the period
* ✶ P is the **initial amount** invested or borrowed
* ✶ r is the **interest rate** for the payment interval
* ✶ n is the number of payment **intervals** over the **total period** of the loan or investment

QUESTIONS: FINANCE CALCULATIONS

Question 1 (Adapted from November 2011 P1, Question 1.2.1 -1.2.2)

A South African couple recently visited Botswana and Zambia. The table below shows the exchange rate between the currencies of the two countries and the South African rand (ZAR):

SOUTH AFRICAN RAND TO FOREIGN CURRENCY
R1,00 (ZAR) = 0,95 Botswana pula (BWP)
R1,00 (ZAR) = 681,07 Zambian kwacha (ZMK)

1.1   The couple budgeted to pay R20,00 per person for lunch. How much is this amount in Botswana pula?   (2)

1.2   The accommodation in Zambia cost 360 286 ZMK per couple per day. They paid a deposit of 1 021 605 ZMK to secure their accommodation. Dinner costs 85 134 ZMK per person and they both had dinner at the hotel restaurant four times.

Use the formula below to calculate the total amount they will pay at the end of their ten-day stay at the hotel in Zambia.

Total amount due = (number of days × A) + (8 × B) – C, where:
A = accommodation cost, **B** = cost per dinner and **C** = deposit paid   (3)

Question 2 (Adapted from November 2011 P1, Question 3.1)

Zoey is a university student. Her parents give her a monthly allowance of R2 500 to cover her expenses which consist of the following:
* Monthly cellphone payments
* A total monthly instalment of R400,00 for two clothing stores, Teencraze and Fabfashion
* Daily cost of R25,00 for food
* R110,00 per weekend for entertainment
* Transport costs of R125,00 per week

2.1   TABLE 1 below shows Zoey's budget for April:

TABLE 1: April 2011 budget

Monthly cellphone payments	R240
Teencraze account	R210
Fabfashion account	**A**
Food for the month	**B**
Weekend entertainment for four weeks	**C**
Transport for four weeks	**D**
TOTAL	**R2 330**

2.1.1   Calculate the missing amounts A, B, C and D.   (8)

2.1.2   Calculate the difference between her allowance and her total expenses for the month.
                                                                                          (2)

2.1.3   Zoey needs R200 to go on a university excursion. Name ONE possible way in which she can reduce her monthly expenditure so that she will have enough money for the excursion.
                                                                                          (2)

Question 3   (Adapted from November 2011 P1, Question 3.2)

Zoey will be a student at the university for four years. Analysts have predicted that transport costs will increase at a compound interest rate of 8% per annum.

Calculate how much she will need to budget for her weekly transport in April 2014.
Use the formula: **A = P (1 + i)^n** , where   A = final amount
                                                 P = initial amount
                                                 i = interest rate
                                                 n = number of years   (3)

Question 4   (Adapted from November 2011 P2, Question 2.1 & 2.3)

Ms Vermaas had an accident with her bakkie. The left rear end of her vehicle was hit, resulting in damage to the bumper and the tail gate. Below are pictures of the damages to Ms Vermaas' bakkie.

Tailgate

THE LEFT REAR END OF THE BAKKIE

Bumper

ENLARGED PICTURE OF THE DAMAGED BUMPER
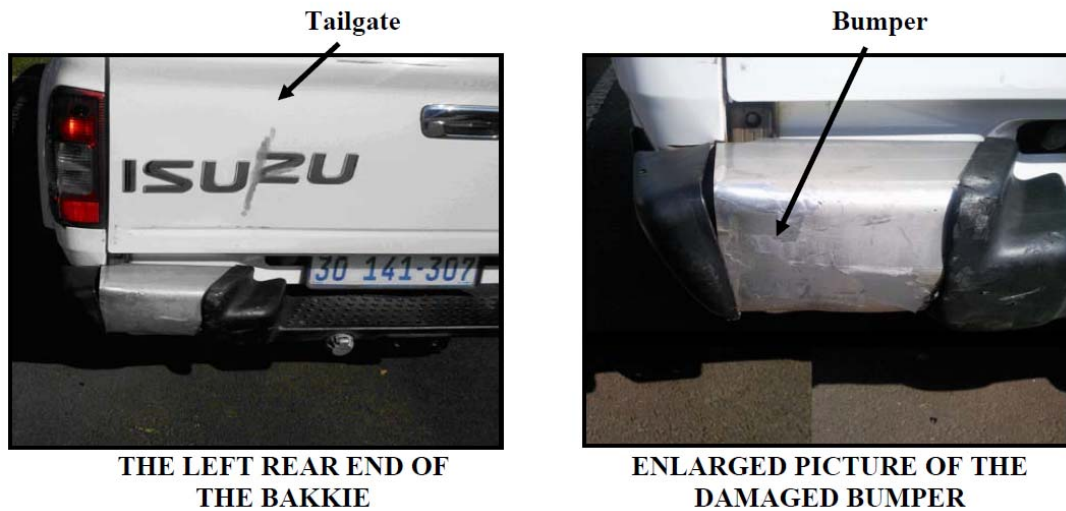
She obtained quotations from three panel beaters (Gail's Panel Beaters, TBOS' Panel Shop and Dong's Panel Beaters) for the repair of the damages to the bakkie.

Each of the quotations (summarised in ANNEXURE B) lists the parts to be replaced, repair work and paint work. The quotations excluded 14% VAT (Value Added Tax).

An additional amount has to be added to each quotation for sundries and consumables. Sundries: administrative cost like telephone calls made to clients and suppliers. Consumables: cleaning materials.

4.1   Use the summary of the quotations on ANNEXURE B to answer the following questions.

4.1.1   Without doing any calculations, Ms Vermaas stated that Dong's Panel Beaters charged the lowest hourly rate to strip and assemble the bakkie. Verify, showing ALL the calculations, whether her statement is CORRECT.   (6)

4.1.2   Gail's Panel Beaters quoted a final total amount of R9 497,93 (including VAT) which included the amount charged for sundries and consumables. Calculate the amount, excluding VAT, charged for sundries and consumables.   (6)

4.2   Ms Vermaas had to decide which panel beater to use and also whether she wanted the tailgate to be repaired or replaced. The final total costs, inclusive of VAT, sundries and consumables, are given in TABLE 1 below:

TABLE 1: Final total costs, inclusive of VAT, sundries and consumables

NAME OF COMPANY	FINAL TOTAL COSTS
Gail's Panel Beaters	R9 497,93
TBOS' Panel Shop	R5 132,55
Dong's Panel Beaters	R12 983,11

Ms Vermaas decided that the tailgate had to be replaced. Use ANNEXURE B and TABLE 1 above to answer the following questions.

4.2.1   Briefly explain why she did not choose TBOS' Panel Shop.   (1)

4.2.2   Which panel beater would be the best option for her? Give a reason for your answer.
                                                                                                        (3)

Annexure B

GAIL'S PANELBEATERS			LABOUR COSTS			
			Paint/ Spray		Strip and Assemble	
Method	Parts/Description	Price in rand	Hours	Total in rand	Hours	Total in rand
Strip	Strip and assemble				3,75	750,00
Paint	Rear bumper		1	850,00		
Replace	1 tailgate	5 348,26				
	1 L/Rear bumper	298,35				
	1 L/Rear bumper end	368,17				
	1 centre bumper rubber	584,75				
Total Parts Costs		R6 599,53	Total Labour Costs = R1 600,00			

TBOS' PANELSHOP			LABOUR COSTS			
			Paint/ Spray		Strip and Assemble/ Repair work	
Method	Parts/Description	Price in rand	Hours	Total in rand	Hours	Total in rand
Strip	Strip and assemble				2,5	400,00
Paint	Repaired areas		1	1 000,00		
Replace	Towbar cover	514,08				
	Towbar centre step	505,22				
	Towbar ends	638,36				
Repair	Tailgate				5,0	800,00
	Towbar				3,75	600,00
Total Parts Costs		R1 657,66	Total Labour Costs = R2 800,00			

DONG'S PANELBEATERS			LABOUR COSTS			
			Paint/ Spray		Strip and Assemble	
Method	Parts/Description	Price in rand	Hours	Total in rand	Hours	Total in rand
Strip	Strip & assemble				3,5	700,00
Paint	Repaired areas		2	1 800,00		
Replace	1 tailgate	5 348,26				
	1 tailgate badges	749,13				
	1 rear bumper and tow hitch	2 592,50				
Total Parts Costs		R8 689,89	Total Labour Costs = R2 500,00			

MAPWORK

STUDY NOTES

1. INTRODUCTION

Anything drawn on a map is smaller on the map than it is in real life. When representing a real object on paper, it is important that all the dimensions stay in proportion. To ensure that this happens, a scale is used. The map scale shows how much smaller than real life the things have been drawn on the map.

2. DIRECTION

Maps should show direction between things using compass directions.
The Earth is divided into 4 main cardinal points, namely North, South, East and West. For added accuracy these main points are further subdivided, as shown below.
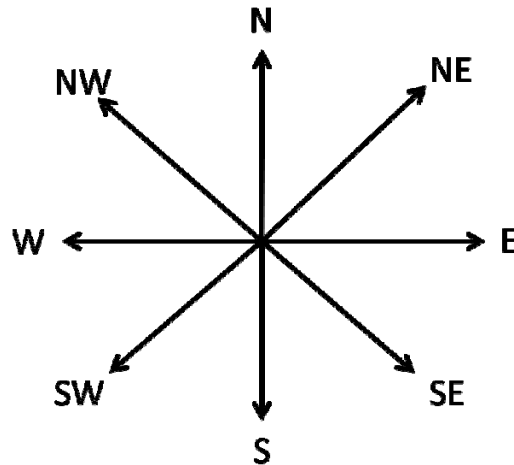
3. GRIDS

Grids drawn on a map enable us to find what we are looking for much quicker and to describe the relative position of a location with added accuracy. A grid reference is a set of numbers and letters that designate a location on the map. It is generally accepted that the letter of the alphabet is quoted first, followed by the number reference.

4. USING A SCALE

A scale can be drawn in two different ways:
- A line or linear scale

- A representative fraction
  1:4 000 000

Example a scale of 1:100 means that every 1 unit on the drawing is actually 100 units in real life. It does not matter which units you choose to work with, as long as you keep the units consistent.

If you know the distance on a map, it is possible to convert to the actual distance.

e.g. The distance on a map measures 5cm and the scale of the map is 1:2 000 000. What is the actual distance in km?

Write down the scale:	1 : 2 000 000
Write down the measurement you know:	5cm : ?
Multiply both sides by 5:	5cm : 10 000 000cm
Convert to km:	5cm : 100km

e.g. The actual distance measures 12km. How many cm would it be on a map with a scale of 1:50 000?

Write down the scale:	1 : 50 000
Write down the measurement you know:	? : 12km
Convert km to cm:	? : 1 200 000cm

Divide by scale number
1 200 000cm ÷ 50 000 = 24cm, The distance on map is 24cm.

MAPWORK QUESTIONS

Question 1 *(Adapted from Nov 2011, P1, Question 3.3)*

The following seating plan was used for Zoey's first semester examination. Zoey's examination number was 211141112.

EXAMINATION SEATING PLAN

1.1 Identify the row and column in which Zoey sat. (2)

1.2 How many students sat in the same column, but behind Zoey? (1)

1.3 Determine the general direction of the emergency exit from where Zoey sat. (2)

1.4 Examination rules state that each candidate must occupy an area of at least 0,75 m^2.
   Calculate the minimum total area occupied by the students in this examination venue. (3)

Question 2 *(Adapted from Nov 2011, P2, Question 3.1)*

The Naidoo family lives in Pietermaritzburg. A map of South Africa showing the national roads (marked N1, N2, et cetera) is given on below.

MAP OF SOUTH AFRICA
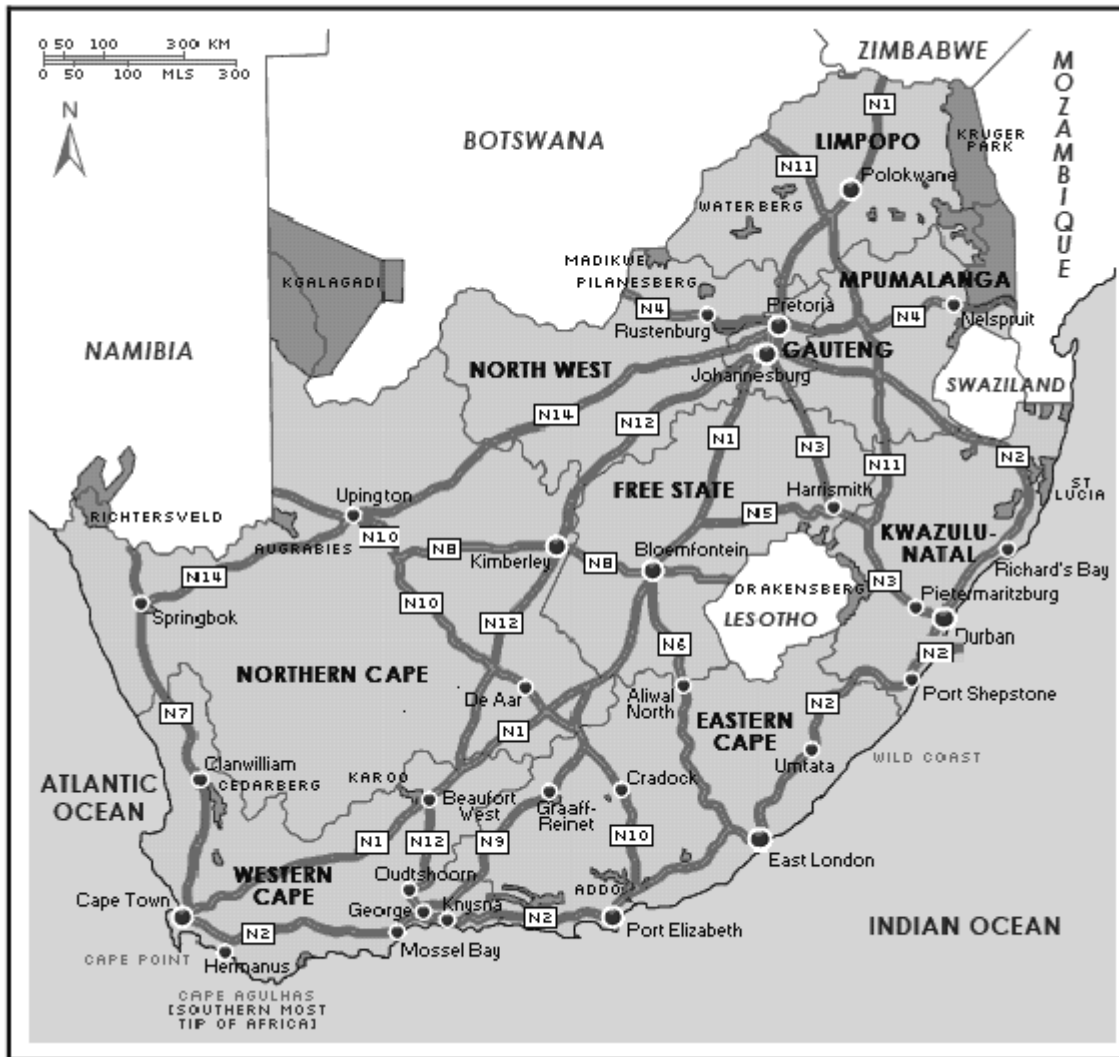
Use the map of South Africa to answer the following questions.

2.1   The family travelled from Pietermaritzburg to Johannesburg by car, using the N3.

2.1.1(a)   Use the map and a ruler to measure the distance, in centimetres, on the map between these two cities.   (2)

(b)   Hence, use the scale given on the map to calculate the actual distance, in kilometres, between these two cities.   (5)

2.1.2 The car travelled at an average speed of 110 km/h. They departed at 08:15 and planned to arrive in Johannesburg at 14:30. Determine whether they arrived at their destination at the predicted time.

Use the formula:
Distance = average speed × time (5)

2.1.3 The family left Pietermaritzburg with a full tank of petrol. Along the way they stopped at a petrol station to refuel at a cost of R455,40. The capacity of the tank is 60 litres and the cost of fuel is R10,12 per litre.

   (a) Before refuelling, the fuel gauge indicated that the tank was half full. Verify, showing ALL calculations, whether the fuel gauge was working properly. (6)

   (b) If the car's fuel consumption was 9 litres per 100 km, determine how far they were from Johannesburg when they refuelled. (3)

Question 3 (*Adapted from Nov 2011, P2, Question 3.2*)
Use the map of South Africa to answer the following questions.

3.1 Describe, in detail, the shortest possible route, using the national roads, to travel from Port Shepstone to Upington. (5)

Question 4 *(Adapted from Nov 2011, P2, Question 3.3)*

Use the map of South Africa to answer the following questions.

4.1 Mr Naidoo gave the following directions to Mrs Khumalo using his cellphone:

   From George, travel north along the N12. When you reach Beaufort West, take the N1 and travel through Bloemfontein to Pretoria. Then travel along the N4 in a westerly direction. The next town will be your destination.

   What is Mrs Khumalo's destination? (2)

Question 5 *(Adapted from Nov 2011, P2, Question 4.1 - 4.2)*

The diagram below is the floor plan of Mrs Wong's new home.
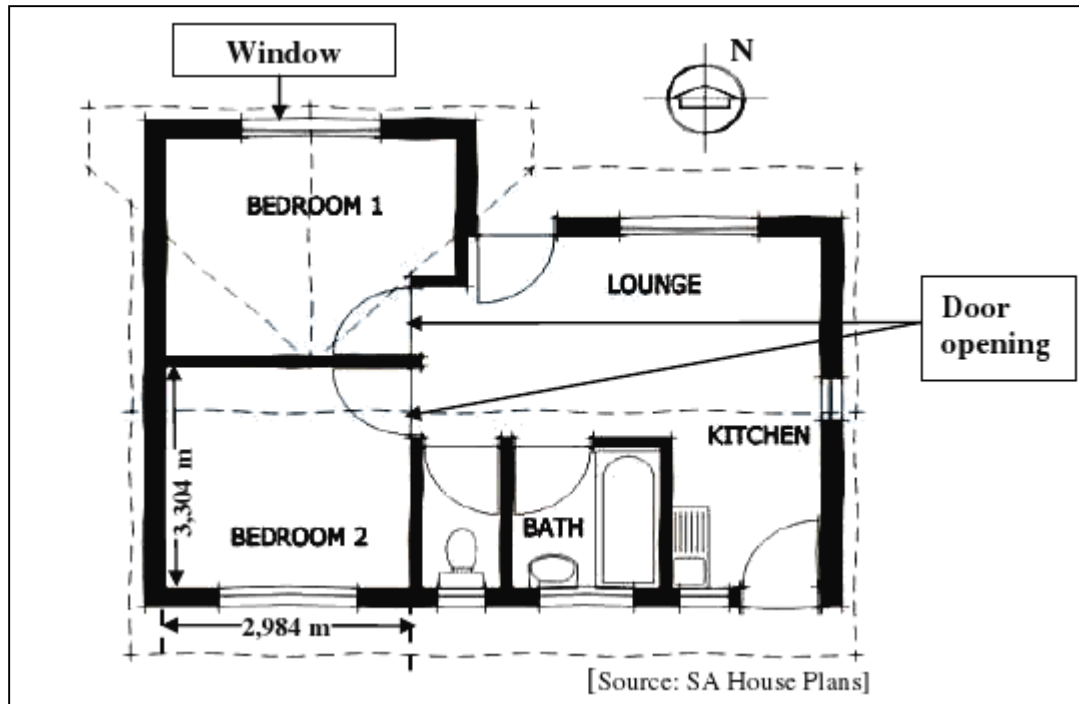
[Source: SA House Plans]

*   The height of the INSIDE WALLS of all   rooms, from the floor to the ceiling,

       is 2 400 mm.

*   The dimensions of the windows in each   BEDROOM are 160 cm × 130 cm.

*   The height of a DOOR OPENING is 2,14 m.

       The following formula may be used:

       Area = length × breadth

5.1   In which general direction does the window in BEDROOM 2 face?   (2)

5.2   The area of a door opening is 9% more than the area of a bedroom window. Calculate the width of a door opening in metres.   (5)

WORKING WITH GRAPHS

STUDY NOTES

TABLES OF DATA

Most information represented in graphs first gets collected in tables of data. These tables are a collection of information, which can be represented by how different variables relate to one another. Make sure you can find missing values from a table by recognising the relationship between the variables.

Using a combination of data tables and graphs, you can work out points of interest, such as intersection with axes and points of intersection on the graph. You also need to be able to interpret where what it means when on line is above another line e.g when will a company make a profit and when will it be making a loss.

THE CO-ORDINATE SYSTEM – A SET OF AXES

A co-ordinate system is a system of axes that represent the values of two variables. One of the variables usually depends on the other.

An axis in a coordinate system is similar to a number line. The values on the horizontal axis are of the independent varial. These increase from smallest to biggest as we move from left to right. The values on the vertical axis (dependent variable) increase from smallest to biggest as we move from the bottom to the top.Every axis needs to be labeled so that the person reading your graph can clearly see what variables are being considered.

SCALE

Each of the axes has a specific scale. The scale tells us how many units each block represents if you are using block-paper. For example, every block on the Cost axis (vertical axis) might represent five rand while every block on the time axis (horizontal axis) might represent one minute. The scale helps us to position a line in such a way that it is clear and fills the co-ordinate system properly.

DRAWING A GRAPH

You must make sure you can read off data from a table and use this to draw a graph. Make sure you work neatly so that when you read off values from your graph, they will be accurate.

READING VALUES OFF A LINE GRAPH

Once you have plotted points on a line graph you can use them to read off information that may not be contained in your table.

We use the axes to help us read off specific values. If the value on the horizontal axis is given, you go to that point and use your ruler to move upwards until you get to the line of the graph. Then turn your ruler through ninety degrees so that it is now horizontal and read off the value on the vertical - axis.

On a graph we can quickly see if two lines intersect (cross each other). This can be used as a tool to see which line is below or above another line at a specific point. For example, on a graph of cost of two cellphone contracts, knowing where one line is above another will help us decide which contract is cheaper or more expensive than the other.

TYPES OF GRAPHS

Make sure you can draw and interpret information shown in the different types of graphs.

BAR GRAPHS

Bar graphs are used for discrete data, i.e. items depicted are completely separate. In this case Mon. is separate from Tues. which is separate from Wed. and so on.

Vertical bar graphs as shown in Fig 1 below, have the frequency on the vertical axis.

In this graph the highest daily taking was 700 dollars which was taken on Wednesday of the week shown.
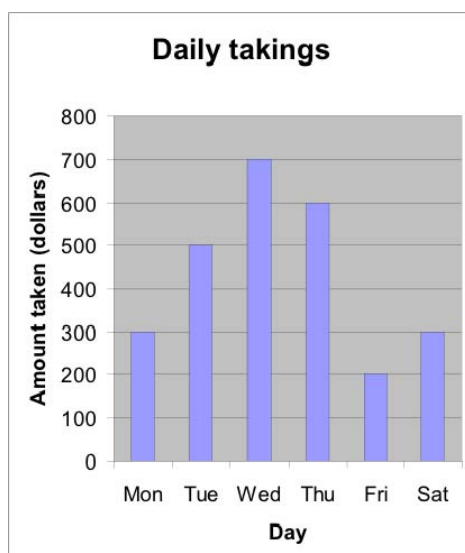
Fig 1

Horizontal bar graphs (Fig 2 below) have the frequency along the horizontal axis.
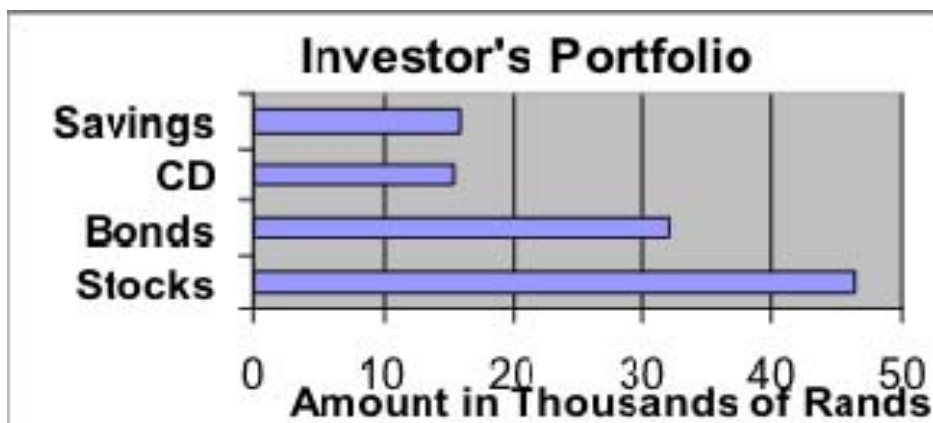
Fig 2

Note again that Savings, CD, Bonds and Stocks are completely different items.

Compound Bar Graphs

A compound bar graph is a bar graph where each bar has been divided into two or more sections. A key is given. Look at this carefully as well as headings and labels on the axes to understand the graph.

TEST ON SAMPLE OF SMOKERS
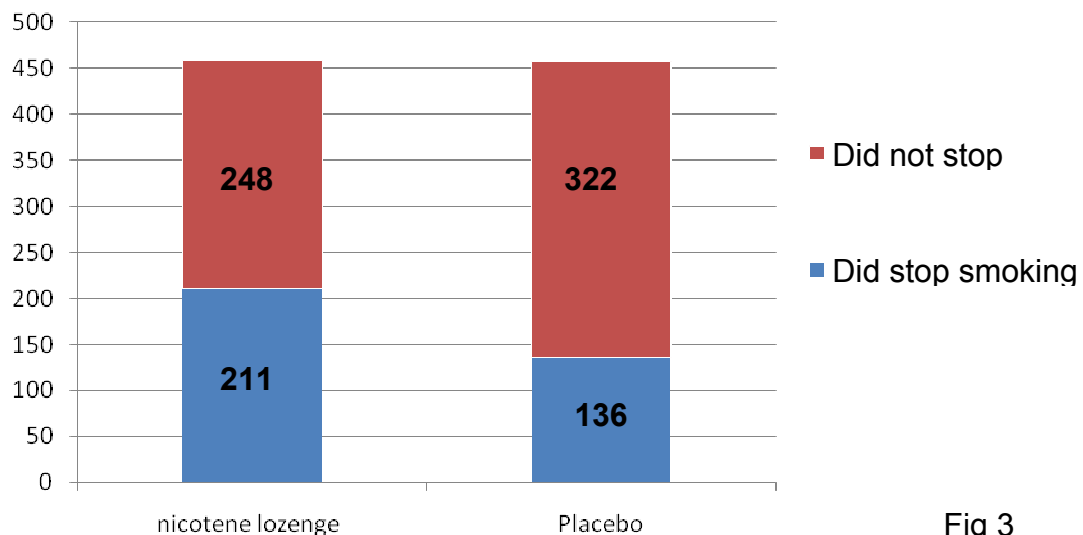
Fig 3

In the compound bar graph above (Fig 3) we notice that a total of 459 (211+248) smokers were given a nicotine lozenge while 458 smokers were given a placebo.

Of those who were given the lozenge, approximately 46% successfully stopped smoking. Of those smokers who were given the placebo 30% stopped smoking.

Multiple Bar Graphs

A multiple bar graph (Fig 4 below) is where each item has a number of bars. Look carefully at the key headings and labels in order to understand the graph.
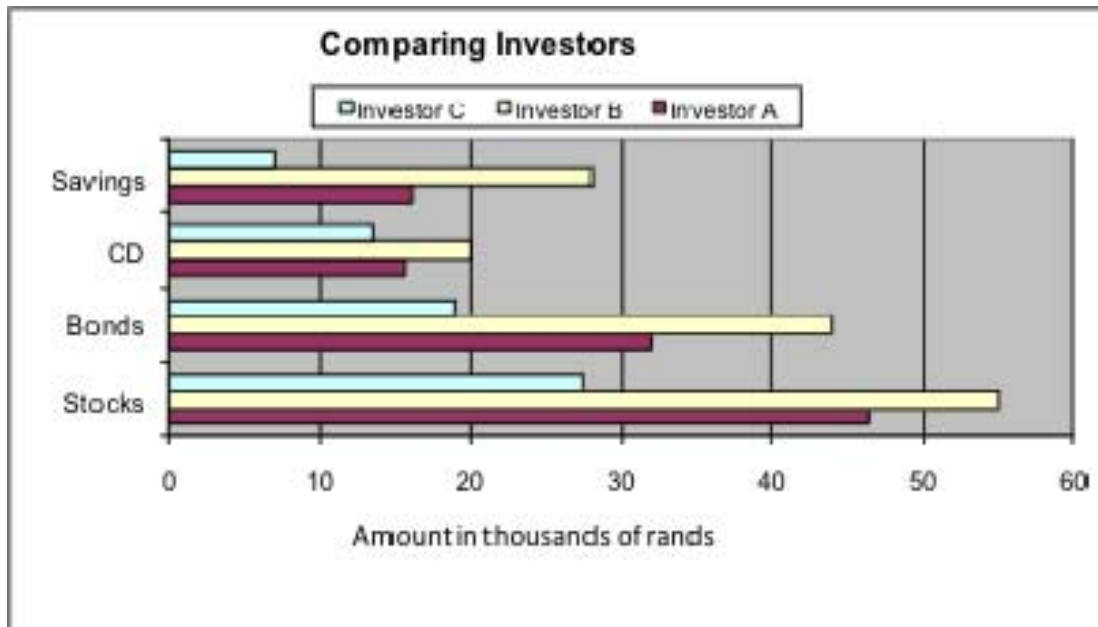
Fig 4

HISTOGRAM

A histogram is used when the data is continuous, e.g. age, temperature, time.
Note: There is no gap between the bars as in a bar graph.

PIE CHARTS

Favourite colours for T-shirts

Black

Red

Yellow

White

Fig. 6

LINE GRAPHS

Diesel Prices

1009

725

518   551

347   360   335   398
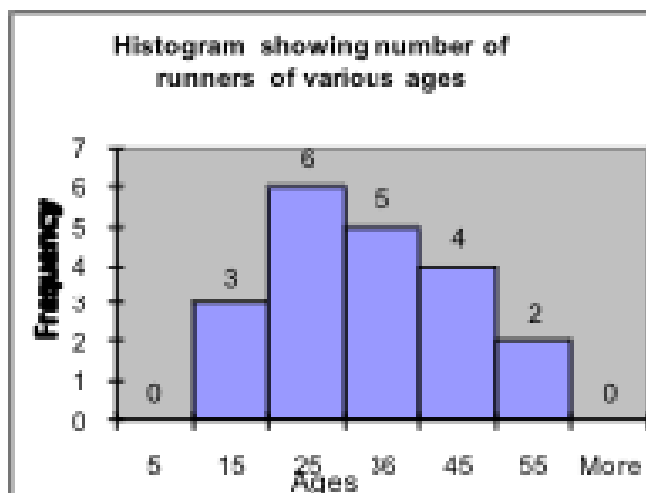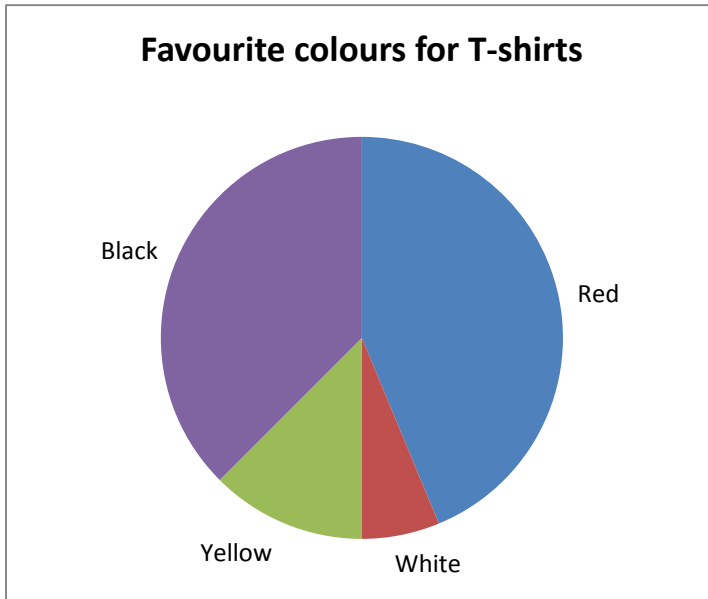
Price in Cents
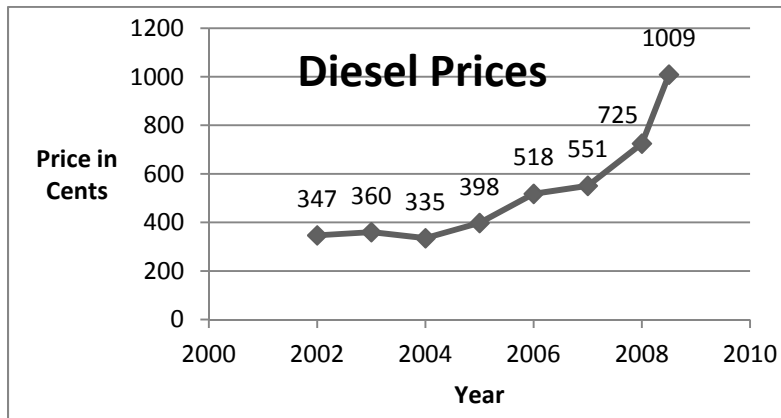
Fig. 7

WORKING WITH GRAPHS QUESTIONS

Question 1 (Adapted from November 2011 P1, Question 1.3.)

Facebook and Twitter are two international social networking sites. Individuals can use Facebook and Twitter to communicate with one another via the Internet.

The following statistics about Facebook and Twitter come from a December 2010 article on the website www.digitalbuzzblog.com:
- Facebook has 500 million users, of which 230 million are male.
- Twitter has 106 million users, of which 50,88 million are male.

1.1

COMPARISON OF USERS OF FACEBOOK AND TWITTER FOR DECEMBER 2010
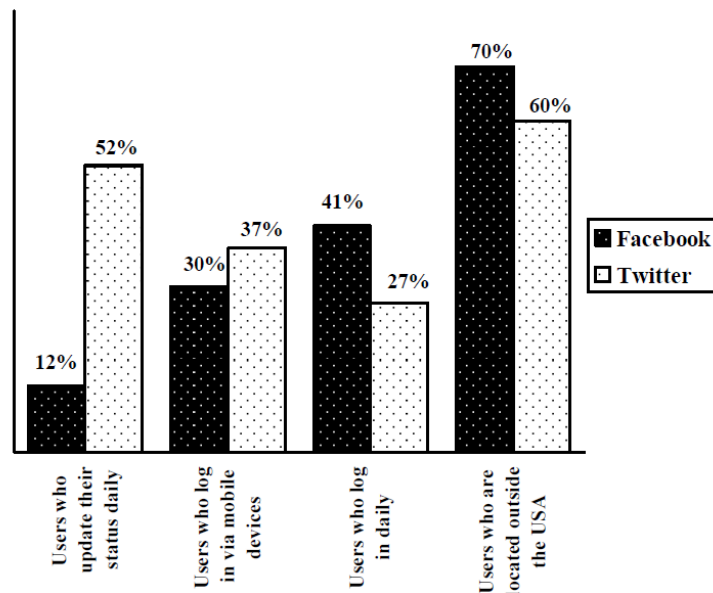
[Graph adapted from data given on: www.digitalbuzzblog.com]

a) Give ONE example of a mobile device. (1)
b) Write down the percentage of Facebook users who logged in using mobile devices. (1)
c) Calculate the percentage of Facebook users who did NOT update their status daily. (2)
d) Determine the number of Twitter users that logged in daily. (3)

Question 2 (Adapted from November 2011 P1, Question 2.1)

The graph below shows the maximum and minimum temperatures of five world cities for 8 March 2011.
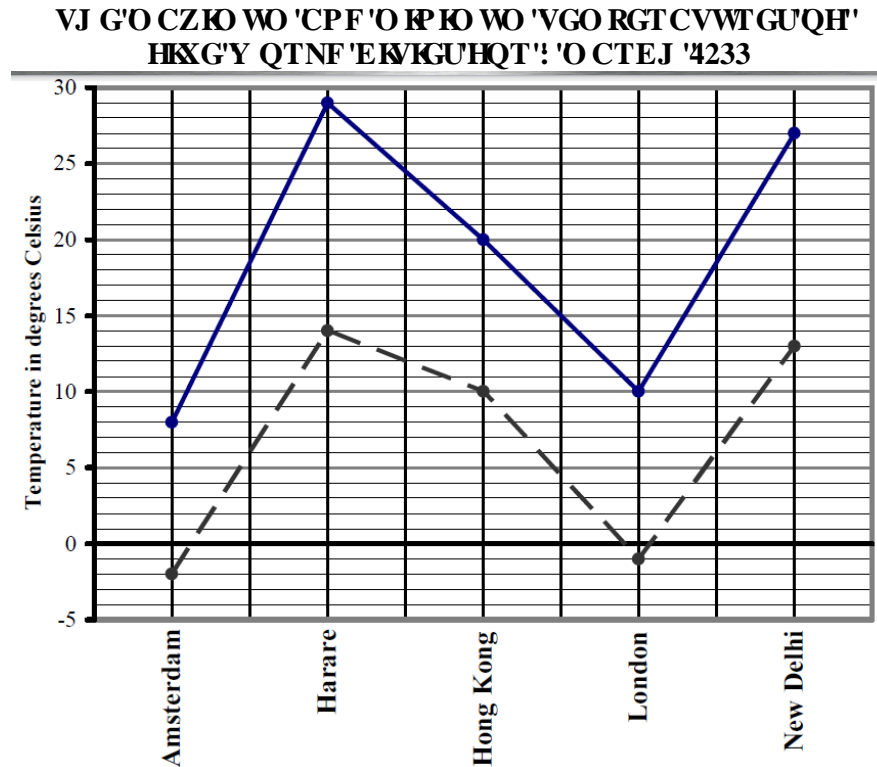
2.1   Write down New Delhi's maximum temperature.   (1)

2.2   Which city had a minimum temperature that was higher than London's maximum temperature?   (2)

2.3   Which city had the lowest minimum temperature?   (1)

2.4   Which city had the highest minimum temperature as well as the highest maximum temperature?   (2)

2.5   Determine the temperature range for Amsterdam.   (2)

Question 3 (Adapted from November 2011 P1, Question 2.3)

The graph below shows the cost of parking at a parking garage that is open 12 hours daily.

EQUV'QH'RCTMKP I 'KP 'VJ G'RCTMKP I 'I CTCI G''
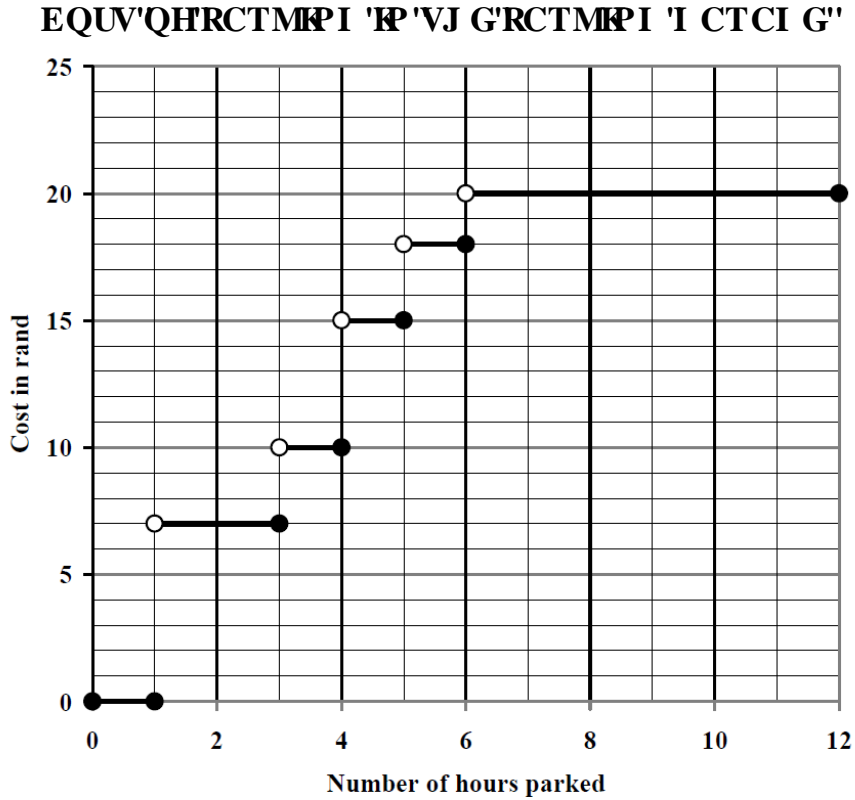
3.1   What is the maximum time that you can park at the parking garage for free?   (2)

3.2   If you paid R10,00 for parking, how long was your car at the parking garage?   (2)

3.3   How much would you pay if you parked your car at the parking garage for 6 hours 42 minutes?   (2)

3.4   How much would you pay if you parked for exactly 3 hours?   (2)

www.learnxtra.co.za

Question 4 (Adapted from November 2011 P2, Question 1)

Timothy is a newly qualified marketing graduate. He has been offered two positions, one as a medical sales representative for Meds SA and the other as a tobacco sales representative for ABC Cigs.

The formula for calculating the monthly salary for a medical sales representative is:

Salary = R3 000 + R500 number of days worked.

As a tobacco sales representative, he will earn a salary of R750 per day for each day worked in a month. He will only receive a salary if he works for one or more days in a month. ×

4.1.1   Write down a formula that can be used to calculate the monthly salary of a tobacco sales representative.   (2)

4.1.2   Draw TWO line graphs on the same grid to represent the monthly salaries for both the positions of medical and tobacco sales representatives. Clearly label each graph.
                                                                                                                                      (8)

4.1.3   Use the graphs drawn, or otherwise, to answer the following.
    a)   After how many working days will the two salaries be the same?   (2)
    b)   Suppose Timothy worked at Meds SA for 18 days. How many days would he have to work at ABC Cigs to earn the same salary?   (2)

DATA HANDLING

DATA HANDLING QUESTIONS

Question 1 *(Adapted from Nov 2011, P1, Question 4.1)*

The Swartberg High Fundraising Committee intends opening a school uniform shop in January 2012. They foresee that the shop will mainly be supported by the new Grade 8 learners.

They surveyed a sample of Grade 8 learners in June 2011 to determine their shoe sizes.

SHOE SIZES OF BOYS:									
5	5	5	6	6	6	6	$6\frac{1}{2}$	$6\frac{1}{2}$	$6\frac{1}{2}$
7	7	7	$7\frac{1}{2}$	8	$8\frac{1}{2}$	9	10	11	

SHOE SIZES OF GIRLS:									
$3\frac{1}{2}$	4	4	$4\frac{1}{2}$	5	5	5	5	5	$5\frac{1}{2}$
$5\frac{1}{2}$	6	6	6	6	6	6	$6\frac{1}{2}$	7	8

1.1 What is the modal shoe size of the boys? (2)

1.2 Determine the median shoe size of the boys. (2)

1.3 Determine the median shoe size of the girls. (2)

1.4 Which shoe sizes are NOT worn by the boys? (2)

1.5 Write, as a ratio, the number of boys not wearing half sizes to the number of girls not wearing half sizes. (3)

Question 2 *(Adapted from Feb/Mar 2011, P1, Question 1.4)*

The **peak time cost** of a cellphone call is R2,90 per minute.

The **off-peak time cost** of a cellphone call is R1,90 per minute.

Peak time: From 07:00 to 20:00 weekdays

Off-peak time: From 20:00 to 07:00 weekdays and all day Saturdays, Sundays and on public holidays

PEAK AND OFF-PEAK CELLPHONE CALL COST
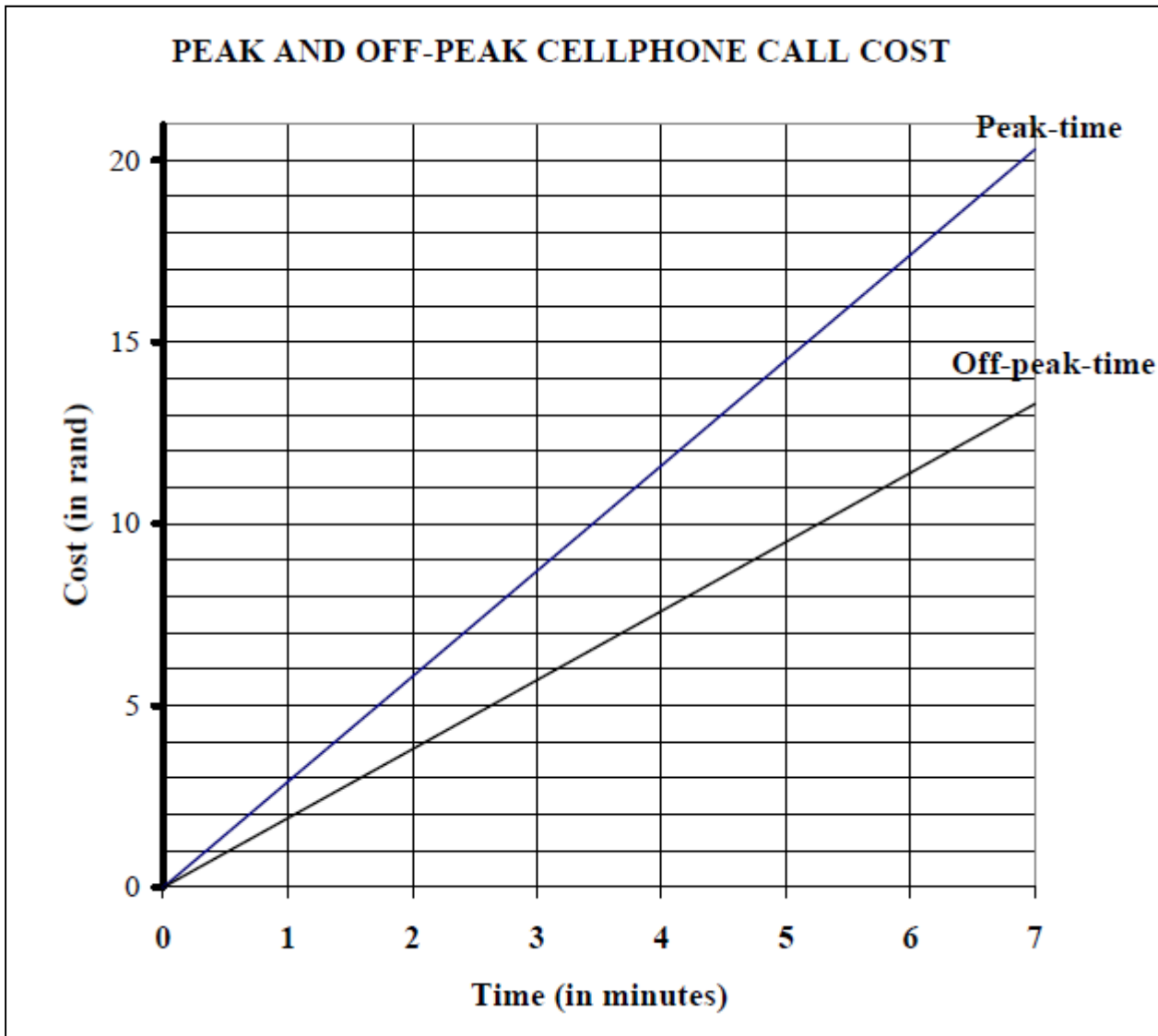
2.1 Calculate the cost of a cellphone call of five minutes made at 13:24 on a Monday.   (2)

2.2 Calculate the cost of a cellphone call of five minutes made on a Saturday   (2)

2.3 You only have R9,00 worth of airtime. Write down the maximum number of minutes that you can talk for on a Tuesday at 09:00.   (2)

Question 3 *(Adapted from Nov 2011, P2, Question 5.1)*

Bathini High School and Vuka Secondary School entered some of their learners in a science competition. The scores (in percentages) for the first round of the competition are given below.

BATHINI HIGH SCHOOL
59 67 67 67 67 72 78 87 87 90 99

VUKA SECONDARY SCHOOL
90 67 67 89 50 78 54 67 95 90 98 57 49 78

3.1 If a learner is selected randomly from Vuka Secondary School, determine the probability that the learner scored more than 90%. Write the answer in simplified form. (3)

3.2 The following table shows the median, mode, mean and range for the two schools:

TABLE 2: Median, mode, mean and range

NAME OF SCHOOL	MEDIAN	MODE	MEAN	RANGE
Bathini High	72%	67%	76,4%	R
Vuka Secondary	P	67%	Q	48

(a) Determine the missing values P,Q and R. (8)

(b) Which school performed better in the competition? Explain your answer. (3)

3.3 The following table shows the percentiles of scores obtained in the science competition for the two schools:

TABLE 3: Scores for the two schools

NAME OF SCHOOL	25th Percentile	60th Percentile	75th Percentile
Bathini High	67%	75,6%	87%
Vuka Secondary	57%	78%	90%

(a) List the scores of the learners from Vuka Secondary School who scored at the 75th percentile or more. (3)

(b) How many learners from Vuka Secondary School obtained scores that were less than the 25th percentile of Bathini High School? (2)

3.4 The science competition consisted of 30 multiple-choice questions worth 2 marks each, 10 questions with one-word answers worth 1 mark each, and 10 short questions worth 3 marks each.

   (a) Except for 12 multiple-choice questions, Lindiwe answered all the other questions correctly. The competition records showed that she was a learner from Bathini High School. Verify, by calculation, whether the records were correct. (5)

   (b) Pieter correctly answered all the multiple-choice questions and scored a total of 95 marks. Determine ONE possible way in which he scored this total. Show ALL working details. (5)

Question 4 *(Adapted from Nov 2011, P2, Question 5.2)*

The principals of Bathini High School and Vuka Secondary School compared their schools' 2010 matric results. The comparisons of the passes are shown in the table below.

TABLE 4: Comparison of 2010 matric passes for the two schools

NAME OF SCHOOL	NUMBER OF LEARNERS PER TYPE OF MATRIC PASSES			PERCENTAGE PASS
	Degree	Diploma	Certificate	
Bathini High	4	5	20	96,67
Vuka Secondary	65	44	25	87,58

4.1 How many learners of Bathini High failed their matric examination in 2010? (4)

4.2 If a learner from Vuka Secondary School is chosen randomly from those who passed, what is the probability that this learner qualified for degree studies? Give the answer as a percentage, rounded off to ONE decimal place. (4)

4.3 In 2010 one hundred and fifty three learners wrote the matric examination at Vuka Secondary School.

   Analyse the results of the two schools to determine which school performed better. Motivate your answer by giving at least TWO valid reasons. (5)

Question 5 *(Adapted from Nov 2011, P1, Question 5.3)*

Peter is in the front of the queue to buy a chocolate for his mother and randomly chooses a chocolate. There are 50 chocolates left that are wrapped as follows:

- 17 silver

- 20 gold

- 13 red

Determine the probability that Peter will choose a chocolate wrapped in:

5.1 Red foil   (2)

5.2 Green foil   (2)

PERIMETER AREA & VOLUME

STUDY NOTES

PERIMETER

When calculating perimeter, you are calculating the distance around the object, for example, the distance around a soccer field or building. If you walk around the soccer field measuring with a measuring tape, you would be calculating the perimeter. Where all the sides of the object are of different lengths, you simply add them together. The following formula is used where the two lengths are the same and the two breadths/widths are the same.

The formula to calculate perimeter is: **2L + 2B = P**

Where: L = Length
             B = Breadth
             P = Perimeter

SURFACE AREA

When we consider 3 dimensional objects, surface area is the total area of the object or the area of all the faces added together. Each face is a 2 dimensional shape. Therefore, we begin by looking at the formulae for the AREA of various 2 dimensional shapes.

Basic Area Formulae

- **Area of rectangle** = length X breadth = L x B (in sketch below)

  A = LB
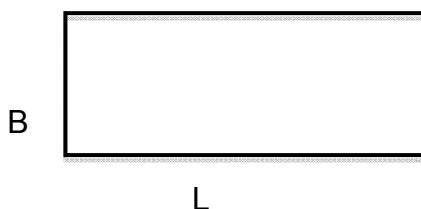
- **Area of parallelogram** below = base x height = bh
  A = bh

5cm

7cm
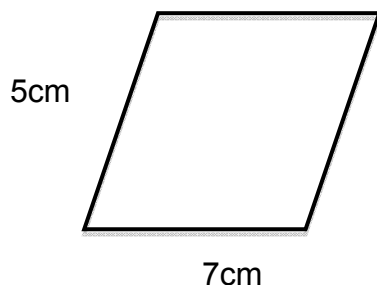
A = bh
A = 7 x 5
A = 35cm^2

- **Area of triangle** below = ½ x base x height

A = ½ bh
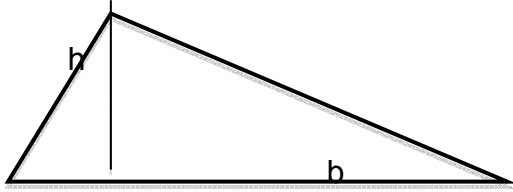
Area of trapezoid below = ½ x (b1+b2) x h where b1 and b2 are the parallel sides and h is the perpendicular height between them

A = ½ x (b1+b2) x h
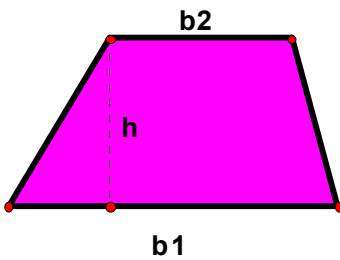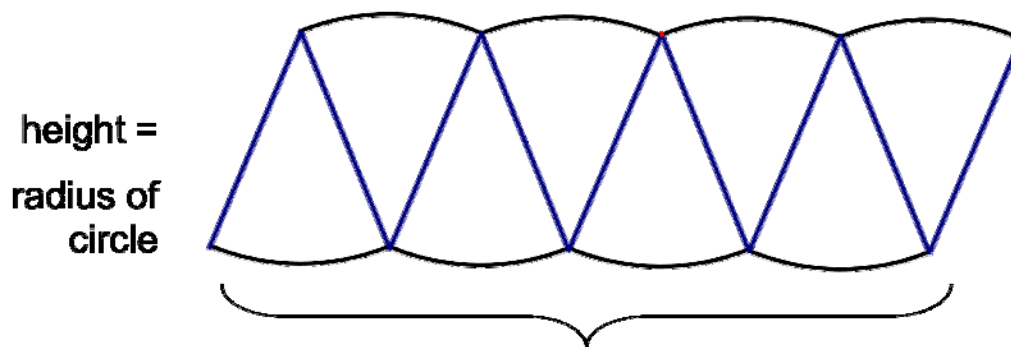
Area of circle:

Area of Circle = ½ x circumference x radius
Area of Circle = ½ x (2 x Pi x radius) x radius
Area of Circle = Pi x radius^2

SURFACE AREA OF RIGHT PRISMS AND RIGHT CIRCULAR CYLINDERS

A **prism** is a 3 dimensional object that has the same shape of exactly the same size on opposite sides of the object, and a constant height must exist between the identical sides.
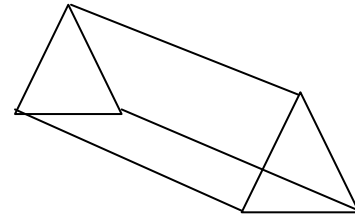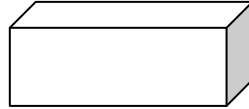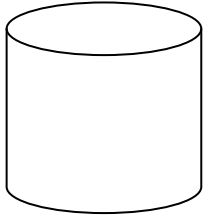
Surface Area of Prism = Total area of ALL **individual** surfaces
The formulae to follow are:

1. **Circular prisms or cylinders**
    2 (Area of circle) + Area of rectangle
    = 2 (πr^{2}) + l X b

2. **Triangular prisms**
    2 (1/2 X b X h) + 3 (l X b)

3. **Rectangular prism**
    A = Length X Breadth, (6 times)

VOLUME OF RIGHT PRISMS AND CYLINDERS
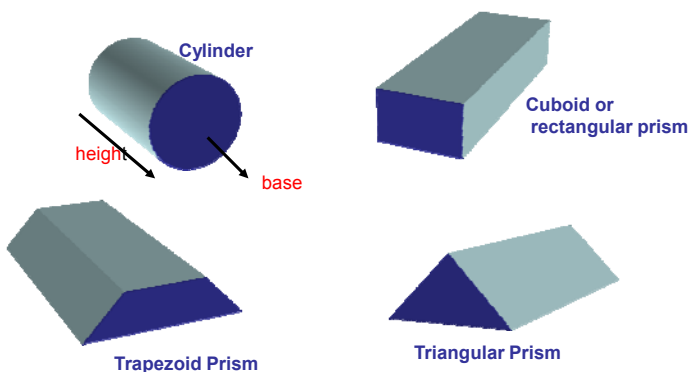
Volume of Prism = Area of base (dark blue) X height

Rectangular Prism   V = length X breadth X height

Volume = Area of base X height
         = (12X 5) X 8
         = 60 m^2 X 8 m
         = 480 m^3

8m

12m

5m

Triangular Prism

height of triangle

6cm   6cm
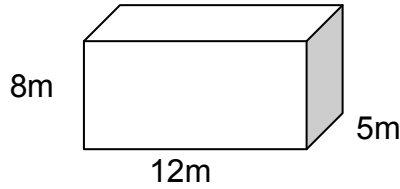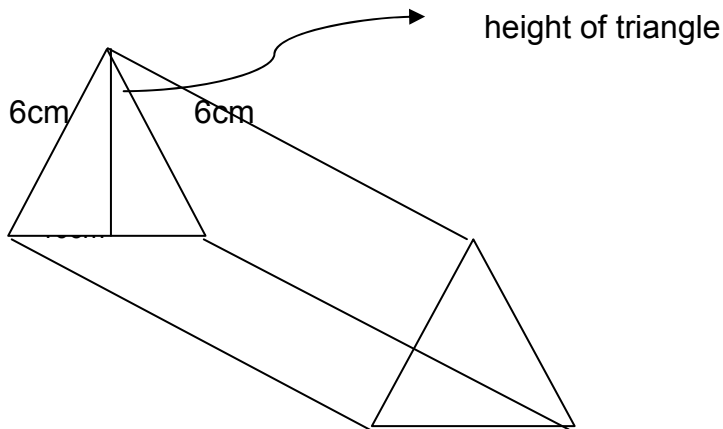
Volume = Area of base X Height
         = Area of triangle X Height
         = ½ base X height X Height

Cylinder   V = $πr^2$ h

Volume = Area of base X height
         = Area of circle X height
         = $πr^2$ X height

4m

8m
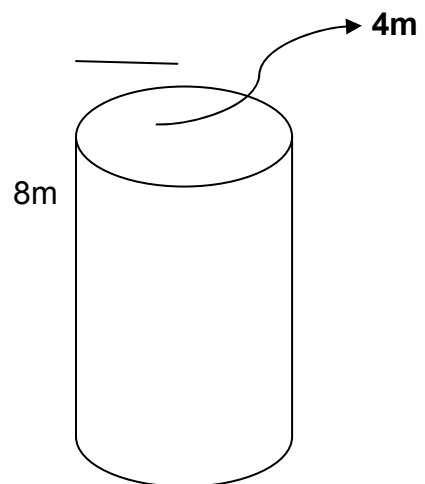
PERIMETER AREA & VOLUME QUESTIONS

Question 1 *(Adapted from Nov 2011, P1, Question 6.2)*

Two weeks before the final hockey match a concert was held on the hockey field. The stadium manager inspected the field after the concert and found that some of the lines on the field were unclear and part of the grass on the field was damaged.

The dimensions of the hockey field are:
length = 98 m
breadth = 72 m
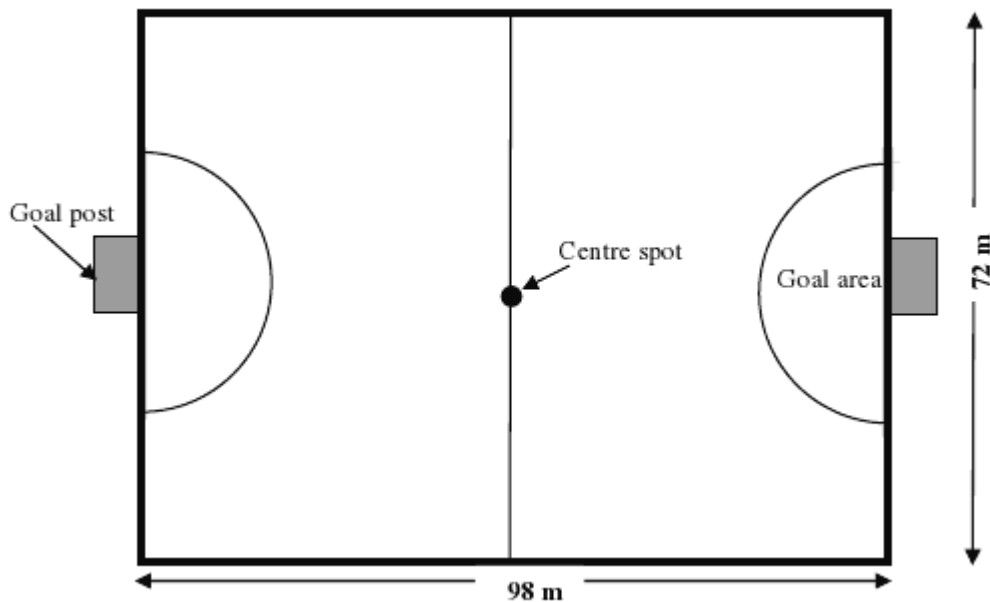
The following formulae may be used:

Perimeter of a rectangle = 2 (l + b), where
l = length and **b** = breadth

Area of a circle = π × (radius)^2, using π = 3,14
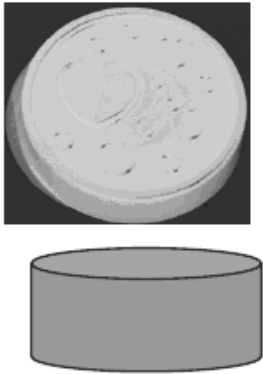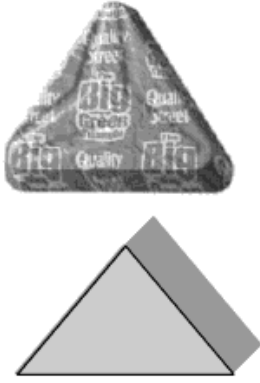
1.1   All the outside boundary lines (bold lines) have to be re-marked and one of the goal areas (semicircle) has to be re-grassed.

   (a) Determine the total length of the boundary lines of the hockey field that need to be re-marked. (3)

   (b) Calculate the area of the ONE goal area that has to be re-grassed, if the radius is 16 m. (3)

1.2   If it takes 25 minutes to re-mark 8,5 m of boundary lines, calculate how long, in hours, it would take to re-mark 100 m of boundary lines. (3)

Question 2 *(Adapted from Nov 2011, P1, Question 5.1)*

The Umgababa Men's Society is responsible for raising funds to take the mothers in the community on an outing on Mothers' Day. They decide to make chocolates and sell them to the community. They use a special chocolate recipe to make either round or triangular shaped chocolates. The price of each chocolate is determined by the volume of the chocolate. The chocolates are covered with foil wrapping.

The diagrams below show the dimensions of the two different shapes of chocolate.

ROUND CHOCOLATES (CYLINDER)	TRIANGULAR CHOCOLATES (TRIANGULAR PRISM)
Radius of the cylinder = 18,5 mm Height of the cylinder = 10 mm	**The triangle has three equal sides.** Each side of the triangle = 50 mm Height of the triangle = 43,3 mm Height of the prism = 10 mm

The following formulae may be used:

Volume of a cylinder = $\pi \times r^2 \times h$

Total surface area of a cylinder = $2 \times \pi \times r \times (r + h)$,

where $\pi = 3{,}14$; r = radius of the cylinder and h = height of the cylinder.

Volume of a triangular prism = $\frac{1}{2} \times s \times h \times H$

Total surface area of a triangular prism = $(s \times h) + 3(s \times H)$,

where s = side of triangle, h = height of triangle and H = height of prism

Calculate the following:

2.1	Volume of a round chocolate	(3)
2.2	Volume of a triangular chocolate	(3)
2.3	Total surface area of a round chocolate	(4)
2.4	Total surface area of a triangular chocolate	(3)

Question 3 *(Adapted from Nov 2011, P1, Question 4.2)*

The shoe boxes in which the shoes will be packed have the following dimensions:

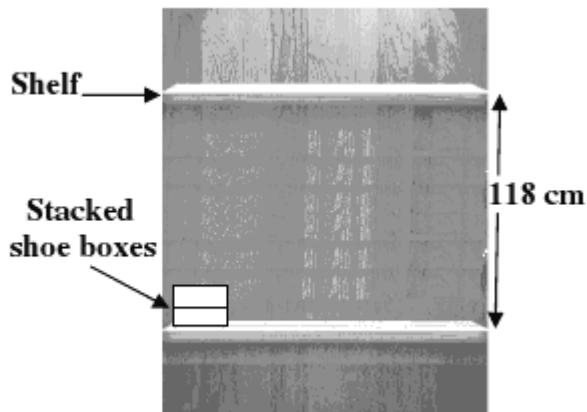Length = 27,5 cm

Breadth = 15 cm

Height = 11,9 cm

3.1   Calculate the volume of the shoe box.

Use the formula:

Volume = length × breadth × height   (3)

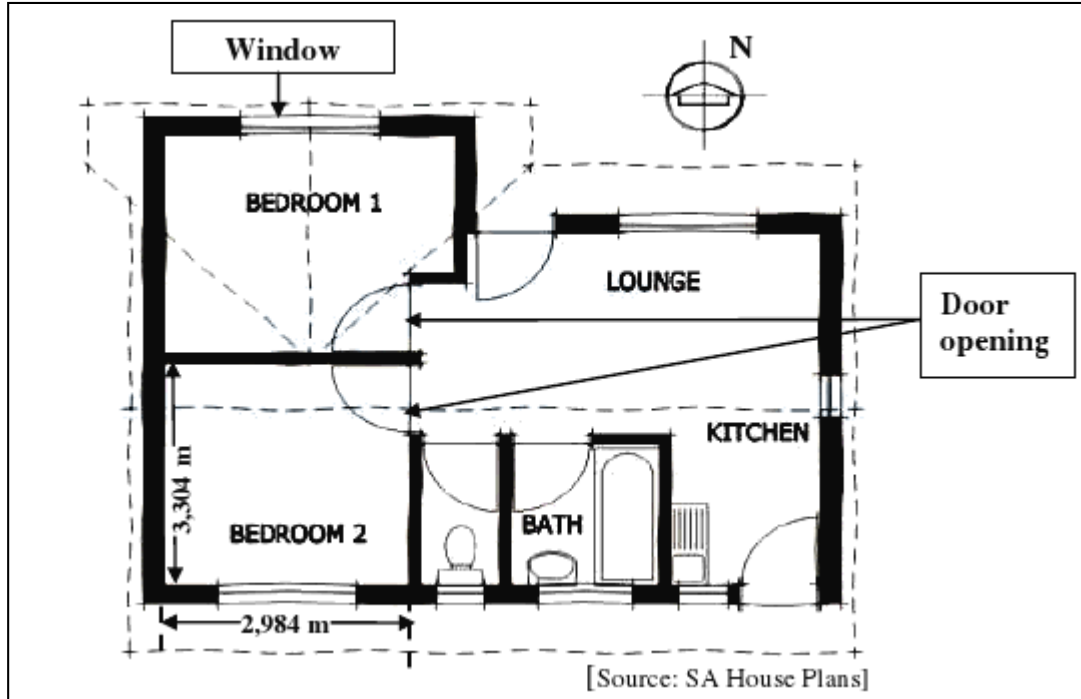3.2   The shoes are packed on shelves. The height between the shelves is 118 cm.

Determine the maximum number of shoe boxes that can be stacked on top of each other in a single pile between two shelves.   (2)

Question 4 *(Adapted from Nov 2011, P2, Question 4.3)*

The diagram below is the floor plan of Mrs Wong's new home.

[Source: SA House Plans]

*   The height of the INSIDE WALLS of all   rooms, from the floor to the ceiling, is

    2 400 mm.

*   The dimensions of the windows in each BEDROOM are 160 cm × 130 cm.

*   The height of a DOOR OPENING is 2,14 m.

The following formula may be used:

Area = length × breadth

4.3   Mrs Wong wants to paint the inside walls of the two bedrooms. The inside walls of
       BEDROOM 1 have a total area of 28,44 m^2.

4.3.1 Calculate the total inside wall area of BEDROOM 2.   (10)

4.3.2 Mrs Wong estimated that the paint for both bedrooms will cost less than R500,00. She
       intended using paint that covers 4 m^2 per litre and which is sold in 5l containers at a price of
       R169,99 per container. Verify, showing ALL calculations, whether her estimation was correct.

                                                                                            (7)