KWAZULU-NATAL PROVINCE
EDUCATION
REPUBLIC OF SOUTH AFRICA

CURRICULUM GRADE 10 – 12 DIRECTORATE

LEARNER SUPPORT DOCUMENT

GRADE 10

MATHEMATICAL LITERACY

STEP AHEAD PROGRAMME
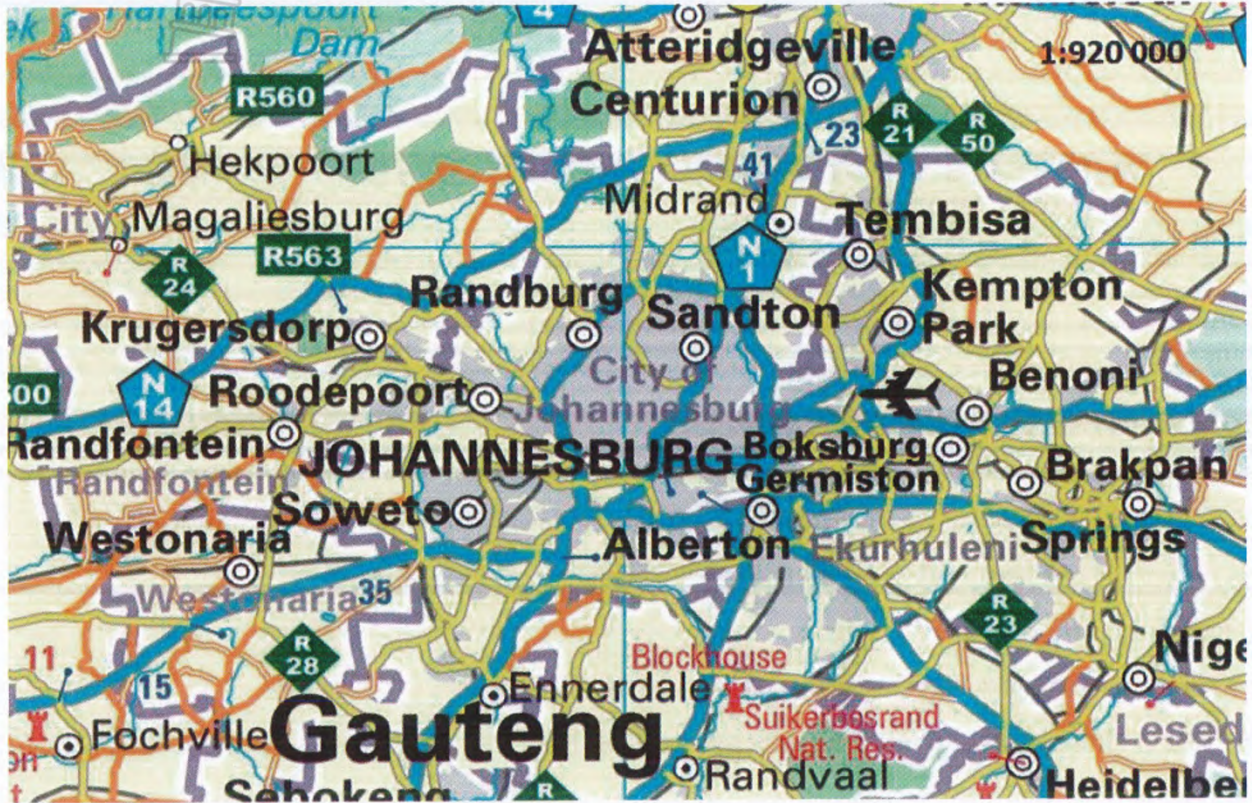
TERMS 2 & 3

2022

This support document was developed and collated by the provincial KZN Mathematical Literacy Subject Advisors

1.3.3   Port Elizabeth to Graaff-Reinet

ACTIVITY 2

Using the Map below answer the following questions:

2.1 Name any TWO National roads found in this map.

2.2 What type of scale found in this map?

2.3 Give one disadvantage of the scale found in this map.

2.4 What is the name of the Regional road found between Heidelberg and Benoni.

2.5 Which province is shown by this map?

ACTIVITY 3

3.1 A map of South Africa has a scale of 1: 50 000

    (i)   Write this scale as 1cm on the map = ...cm on the ground.

    (ii)   Write this scale as 1cm on the map = ...km on the ground.

3.2 Simplify the following scale 3cm: 3m and write it as a unit scale.

3.3 Given the bar scale below. Use the ruler to determine what does it represent (in mm).

Indicates a section within a colour zone

Indicates the colour zone in the stadium
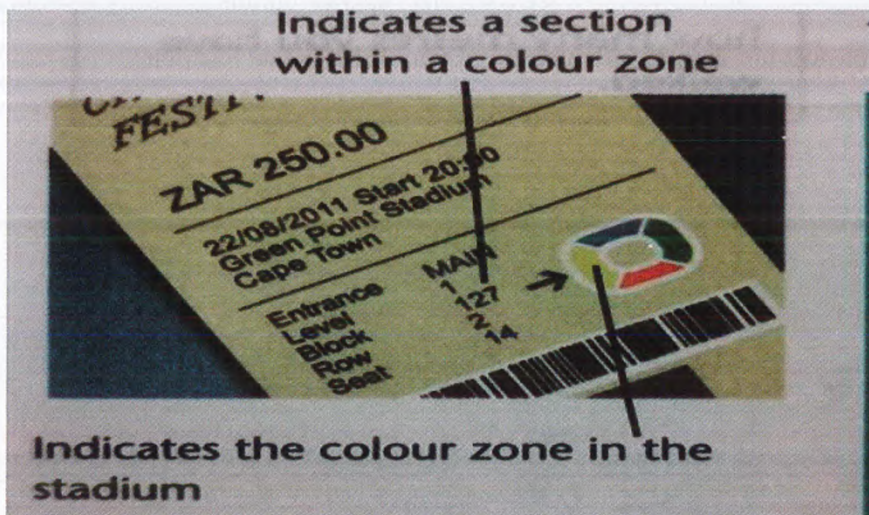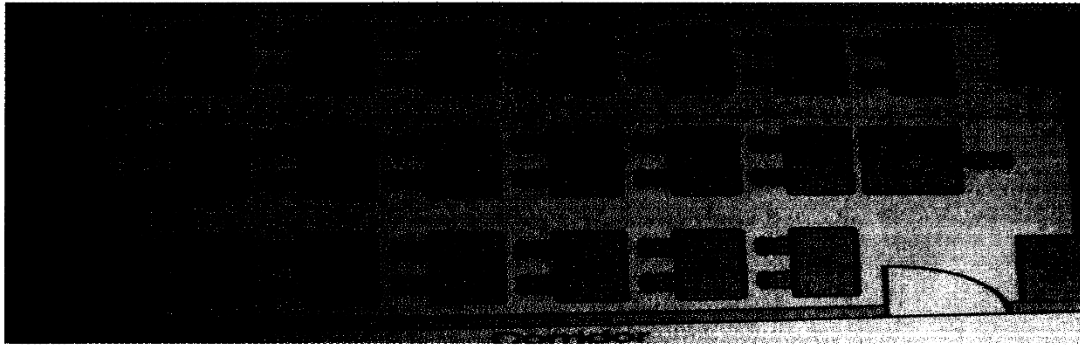
WORKED EXAMPLES

WORKED EXAMPLE

Most tickets for events at the stadiums are marked as follows:

If this was your ticket (on the left) to an event at the Cape Town Stadium, where would your seat be?
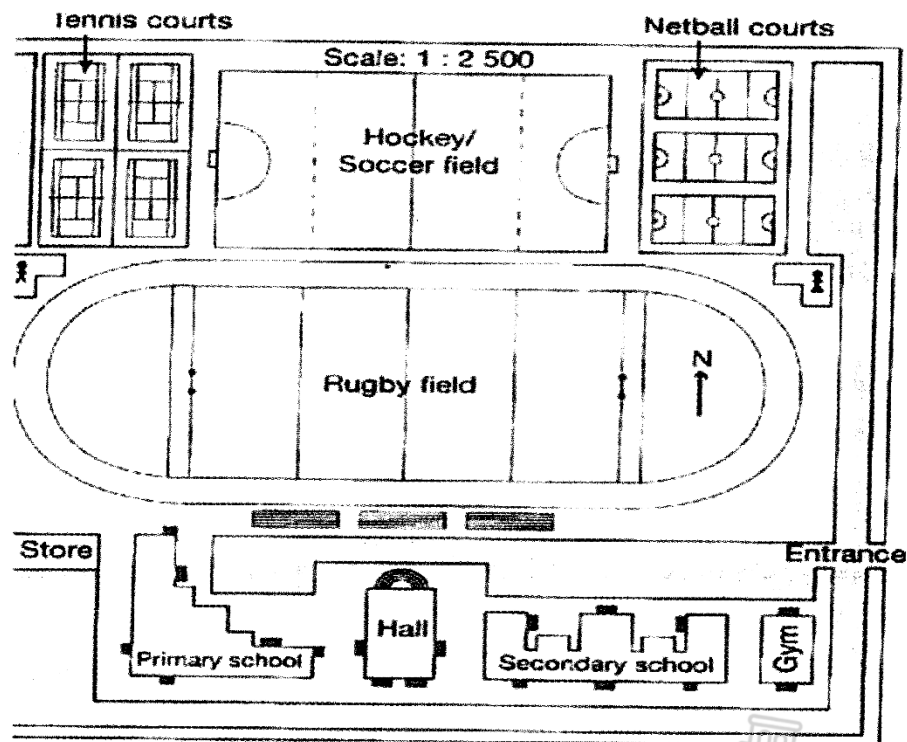
SOLUTION

You would be sitting in this block here:

CAPE TOWN STADIUM

a) Which object is closest to the door?
b) Describe the position of table 7.
c) Write the table number closest to the pillar between the windows.
d) Describe the shortest route from the door to table 21.

ACTIVITY 2

Use the map below and answer the following questions:
Map showing the layout of a school ground

a) Describe the position of the hall.
b) Direct a driver from the entrance to the store.
c) Describe the position of the tennis court.
d) Describe the surroundings of the hockey/soccer field
e) Direct a parent in her car from the netball courts to the front of the primary school

- Think about a fair ordinary dice. To find the probability of rolling a 4, take the number of possible ways of rolling a 4 and divide it by the total number of possible outcomes.
- There is one way of rolling a 4 and there are six possible outcomes, so the probability of rolling a 4 on a dice is $\frac{1}{6}$. This is called the '**theoretical probability**' - in theory, if you roll a dice six times then you should roll a 4 once.

  Probability (4) $= \frac{1}{6}$
- To find the probability of rolling an odd number on a dice, take the number of ways of getting an odd number which is 3 (1, 3 and 5), and divide by the total number of possible outcomes

  Probability (odd number) $= \frac{3}{6} = \frac{1}{2}$

Relative frequency or experimental probability is calculated from the number of times an event happens, divided by the total number of trials in an actual experiment.

$$\text{Experimental probability} = \frac{the\ number\ favourable\ outcomes}{total\ number\ of\ times\ the\ event\ was\ reapeted}$$

The theoretical probability of getting a head when you flip a fair coin is $\frac{1}{2}$, but if a coin was actually flipped 100 times you may not get **exactly** 50 heads, although it should be close to this amount.

If a coin was flipped a hundred times, the number of times a head actually did appear would be the relative frequency/experimental probability, so if there were 59 heads and 41 tails, the relative frequency of flipping a head would be $\frac{59}{100}$ (or 0.59 or 59%).

Worked examples:

Example 1:

Use the words "certain", "possible" or "impossible" to describe the probability of the following happening:

    1.1 The sun sets in the west.
    1.2 Ntando throws a baseball to Tshepiso and Tshepiso catches it.
    1.3 July comes after August.

Answers: 1.1 certain

          1.2 possible

          1.3 impossible

Example 2:

Choose the probability value which best matches the following descriptions:

1;	0;	0,5;	0,25;	0,72

2.1 even chance   2.2 likely   2.3 impossible   2.4 unlikely   2.5 certain

Answers: 2.1 **0,5**   2.2 **0,72**   2.3 **0**   2.4 **0,25**   2.5 **1**

Example 3

5.3 Nkosinathi flips a coin 288 times. Estimate the relative frequency of the number of times the coin lands heads up.

Solutions:

5.1

Person	Number of trials	Number of trials with heads up	Relative frequency
Nelly	55	39	$\frac{39}{55} = 0{,}71$
Zama	200	125	$\frac{125}{200} = 0{,}63$
Muntuza	110	84	$\frac{84}{110} = 0{,}76$
Siyanda	100	36	$\frac{36}{100} = 0{,}76$

5.2 Zama's answer gives the best indication because she conducted the most trials.

5.3 $288 \times 0{,}63 = 181$

P (coin lands heads up) $= \frac{181}{288}$

$= 0{,}63$

**Tree diagrams & Two-way tables:**

Tree diagrams and two-way tables are used to indicate all the possible outcomes of one event, or of many events. Sometimes you are asked to complete one of these (if some information is already given) and sometimes you have to interpret the information in them.

These normally show you theoretical probability (what could happen).

Example 6

A coin is tossed twice. Show all the possible outcomes.

Solution

TREE DIAGRAM

1st	2nd	4 outcomes
	H	HH
H		
	T	HT
	H	TH
T		
	T	TT
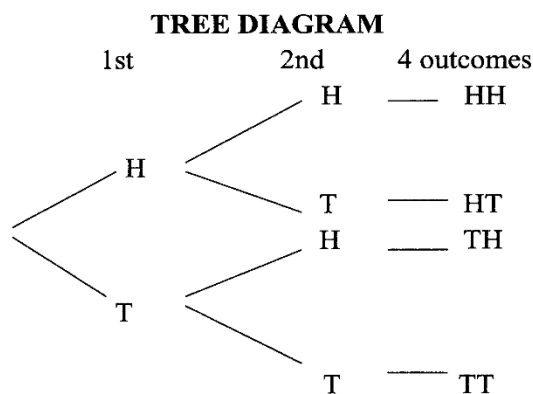
TWO-WAY TABLE

	H	T
H	HH	HT
T	TH	TT

The light grey blocks indicated the possible outcomes of both the events. It therefore means you still have four possible outcomes.

Example 8

In a Grade 10 class of 35 learners, there are 17 girls and one boy wear contact lenses and five boys and four girls wear spectacles.

8.1 Arrange data in a two-way table.

8.2 What is the probability that the first learner you meet in the class will wear contact lenses?

8.3 What is the probability that when choosing a boy from the class at random, he will be wearing contact lenses?

8.4 What is the probability that when choosing a girl from the class at random, she will not be wearing contact lenses or spectacles?

Solutions:

8.1

Learners	Boys	Girls	Total
Contact lenses	1	2	3
Spectacles	5	4	9
Wearing neither lenses nor spectacles	12	11	23
Total	18	17	35

8.2 P (contact lenses) $= \frac{3}{35}$

8.3 P (boy, contact lenses) $= \frac{1}{18}$

8.4 P (girl, no contact lenses or spectacles) $= \frac{11}{17}$

ACTIVITIES

QUESTION 1

A private hospital in China provided the following information regarding the number of patients diagnosed with CORONAVIRUS (COVID-19). The data provided below was collect over a period of three weeks.

	AGES IN YEARS				
WEEKS	<30	30 – 49	50 – 69	≥ 70	TOTAL
WEEK 1	90	140	250	300	
WEEK 2	70	120	160	270	
WEEK 3	50	90	140	220	
TOTAL					

1.1 State the number of patients in the 50 – 69 years age group that were diagnosed with in COVID-19 in WEEK 2.

1.2 Calculate the number of patients who had COVID-19 in each week.

1.3 "The younger you are the less the risk of contracting COVID-19." State whether this statement is true or false by justifying your answer with calculations

1.4 What is the probability that a patient selected from this table is 25 years old?

1.5 How many people contracted this disease over the period of three weeks according to the records from this hospital?

1.6 What is the probability that a patient chosen at randomly in the first week is 70 or more years old? Express your answer as fraction in a simplified form.

QUESTION 5

The stacked bar graph below shows the number if learners in each grade at Mama Sbo's aftercare.
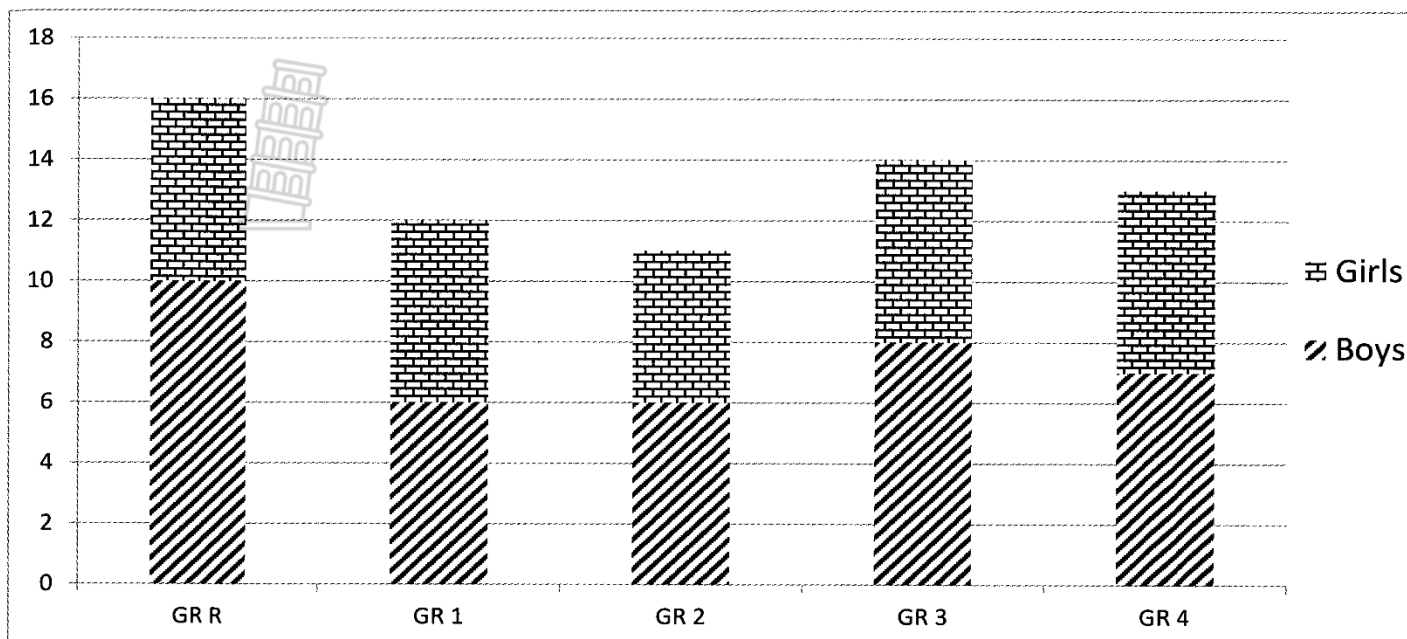
5.1 For the purpose of comparison, data is also organised in a two-way (contingency) table. Organise this data in a two-way table.

5.2 How many learners are in grade R?

5.3 In total, how many learners are there in this school?

5.4 If a learner is chosen randomly from this school in exception of grades 3 and 4, what is the probability that the learner is a girl?

TOPIC	FINANCE – T3	SECTION	INCOME AND EXPENDITURE, PROFIT AND LOSS & BUDGETING
RELATED CONCEPTS/ TERMS/VOCABULARY			
FOUR basic concepts:			

Concept:	Definition:
Personal Income:	Money earned by a person for services rendered or products sold. This can include: salary, wages, commission and tips.
Personal Expenses:	Money paid by a person for services or products acquired.
Profit:	When income EXCEEDS expenses. This can also be a called a surplus.
Loss:	When expenses EXCEED income. This can also be called a deficit.

In each case determine if this person makes a profit or suffers a loss and the amount:

a) Tyler earns R 8 500 monthly and has the following expenses: Rent - R 2750, Water and Electricity - R600, cellphone - R450, bus fare - R385 and food - R2900.

b) Chelsea calculated that her average monthly income is R 10 890 and her annual expenses on average are about R107 700.

ANSWERS:

1.a) Fixed income   b)   Variable income   c)   Occasional income

   d) Variable expense   e)   Occasional expense   f)   Fixed expense

2. a) R 20 000 x 12 = R 240 000

b) R 48 600 ÷ 12 = R 4 050

c) R 4 x 75 = R 300

d) (R40 x 5 x 3) +(R40 x 5 x 3) + (R65 x 5 x 3) = R 2 175

e) R 450 x 30% = R 135

3. a) R8 500 – (R 2750 + R 600 + R 450 + R385 +R 2 900) = R1 415.

∴ Profit of R 1 415

b) (R 10 890 x 12) – R 107 700 = R 22 890

∴ Profit of R 22 890

LEARNER ACTIVITIES

QUESTION 1

Dean's mother, Ella, started her own instant photography business by taking photographs onthe beach. She has a camera, but needs to buy a printer, photo paper and ink cartridges for printing.

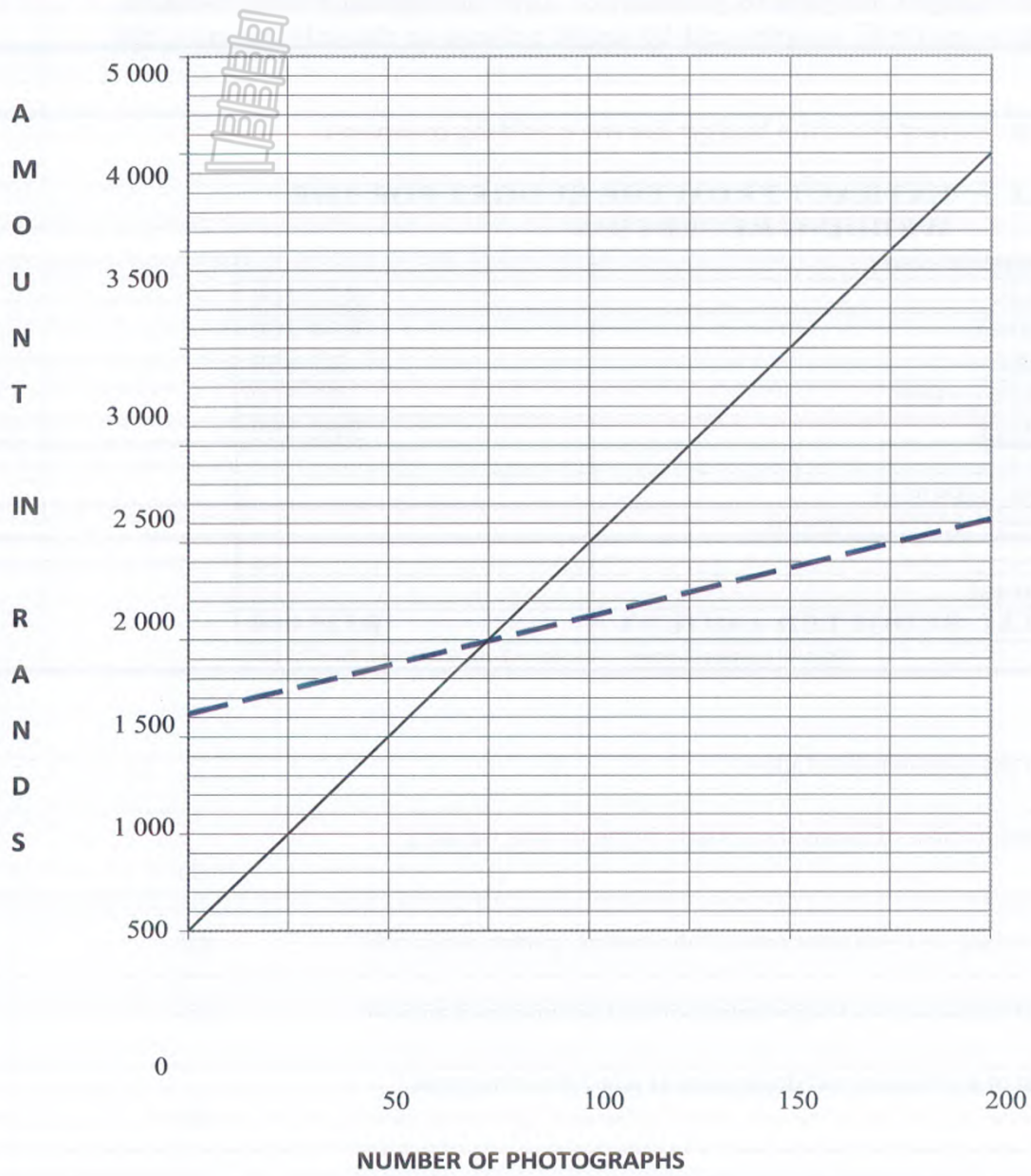| Canon Selphy CP100 photo printer	Canon photo paper + 3 print cartridges
Price = R1 125	

[Adapted from www.takealot.com and www.amazon.com]

TABLE 1 shows Ella's income and expenses for producing and selling up to200 photographs.

TABLE 1: INCOME AND EXPENSES OF ELLA'S PHOTOGRAPHYBUSINESS

ANNEXURE A

QUESTION 1.4

QUESTION 3 – NATIONAL BUDGET

During the last budget speech on 28 February 2017, Minister Pravin Gordon released theNational Budget for South Africa for the 2017/2018 budget year. Study TABLE 2 and answer the questions that follow.

TABLE 3: GOVERNMENT EXPENDITURE BY FUNCTION

R (in million)	2016/2017 Estimate	2017/2018 Estimate	2018/2019 Estimate	2019/2020 Estimate
Basic Education	226 643	242 968	261 292	280 139
Health	170 888	187 483	201 377	217 131
Defence, Public Order and Safety	190 036	198 702	210 814	224 956
Post-school Education and Training	68 952	77 550	80 856	89 839
Economic Affairs	201 658	215 047	227 995	244 003
Municipal Infrastructures	179 834	195 751	210 170	226 402
Total General Public Services consisting of:	69 977	70 695	72 462	75 616
• Executive and legislative organs	12 976	14 340	15 202	16 089
• General public administration	45 185	43 943	44 584	46 775
• External affairs and foreign aid	11 816	12 412	12 677	12 752
Agriculture, Land Reform	25 998	26 534	27 923	29 826
Social Protection	164 936	180 046	193 548	209 088
Allocated by function	1 298 923	1 394 776	1 486 437	1 597 001

Use TABLE 3 above to answer the questions that follow.

3.1 Which function was allocated the most money in this budget? (2)

3.2 Write down the ratio of funds allocated for Basic education to funds allocatedfor Post School Education and Training for 2016/2017 in the form 1 : …. (2)

3.3 Show how the projected expenditure of R70 695 million for General PublicServices was calculated for the 2017/2018 budget year. (2)

3.4 Calculate the percentage of the expenditures that was allocated to EconomicAffairs in the 2016/2017 budget year. (3)

3.5 Calculate the increase (in Rand) for the estimated expenditures of Basic Education from the 2017/2018 budget year to the 2019/2020 budget year. (3)

[12]

WORKED EXAMPLES

Budget vs Income – and – Expenditure Statements
- Both list the income and expenses for the month.
- A **budget** is a list of **expected** income and expenditure.
- An income– and expenditure statement is a list of **actual** income and expenditure.

BUDGET			INCOME-AND-EXPENDITURE STATEMENT	
Income	26 000		**Income**	24 500
▪ Basic Salary	16 000		▪ Basic Salary	16 000
▪ Commission	10 000		▪ Commission	8 500
Expenditure	17 670		**Expenditure**	24 139
▪ Rent	5 500		▪ Rent	5 500
▪ Car repayment	4 000	vs	▪ Car repayment	4 000
▪ Insurance	800		▪ Insurance	800
▪ Medical Aid	670		▪ Medical Aid	670
▪ Food	1 500		▪ Food	1 620
▪ Water and Electricity	700		▪ Water and Electricity	649
▪ Entertainment	1 000		▪ Entertainment	1 350
▪ Petrol	1 500		▪ Petrol	1 400
▪ Savings	2 000		▪ Savings	2 000
			▪ Geyser replacement	6 150

NOTE! This is a list of **EXPECTED** income and expenditure.

NOTE! This is a list of **ACTUAL** income and expenditure.

NOTE!
- The commission and as a result income is less that the budgeted amount.
- The food and entertainment expenses are more that the budgeted amount.
- The water and electricity and petrol expenses are less that the budgeted amount.
- The geyser replacement expense was not budgeted for ∴ it is called an unforeseen expense.

EXAMPLE 1: Look at the budget below and answer the questions that follow:

Income	Amount (R)	Expenditure	Amount (R)
Salary for March	14 000	Rent	6 500
Selling cupcakes	2 000	Water and Electricity	550
		Car Repayment	2 400
		Groceries etc.	1 900
		Cost of making cupcakes	1 250
		Entertainment etc.	2 400

a) Is this a monthly or annual budget?

b) Is this person making a profit selling cupcakes?

c) From the budget identify one variable income and expense.

d) Is this person budgeting their money well? Validate your answer with a calculation.

e) If the salary increases by 10%, what will the new salary be?

c)Total Income % = $\dfrac{7000}{29\,000} \times 100 = 24{,}14\%$	d) Surplus: R29 000 – R24 625 = R 4 375 Yes, they are, as they have money left at the end of the year.

LEARNER ACTIVITIES

MAKE USE OF THE INFORMATION ABOVE TO COMPLETE THE QUESTIONS BELOW:

QUESTION 1

Lebo is in grade 11. His parents give him R250 pocket money monthly. To increase his income, he works as a waiter at a restaurant for two shifts per weekend, four weekends a month. He receives R 200 per shift. Lebo is responsible for the following expenses:

Cellphone contract: R450 monthly

Fuel for scooter: R275 monthly

Toiletries: R175 monthly

Repay loan from dad: R150 monthly

Entertainment / Other: R400 monthly.

a)   What is Lebo's total monthly income?

b)   Draw up a monthly budget for Lebo that includes all financial responsibilities.

c)   Identify one fixed expense from Lebo's budget.

d)   Will Lebo have any money left at the end of the month to put in his savings account?

QUESTION 2

Byron wants to go on a youth camp with his church. The cost of the camp for the weekend is R500. He drew up a budget for himself:

INCOME		EXPENSES	
Pocket Money	**(a)**	Airtime	R150
Part-time work at supermarket	R400	Donation to Church	R50
		Sweets from tuckshop and movies	R150
		Toiletries	R75
Total	R575	Total	**(b)**

a)   Calculate the amount of pocket money Byron receives.

b)   Calculate his total monthly expenses.

c)   How many months will he have to save to be able to go on the camp?

d)   What expense can he cut back on to save more money monthly?

R1 000 is deposited into a savings account. It will earn 2.25% simple interest per annum.

2.1 Calculate the interest earned after one year.

Interest per year = 2.25 ÷100 x R1 000
= R22.50

2.2 Calculate the interest earn per month

Interest per month = R22.50 ÷12   [12months in a year]
= R1.88[rounded to the nearest cents]

EXAMPLE 3

David borrows R3 000 from his father. His father charges him 3% simple interest per month. How much money does David owe his father after one month?

Total amount = Principal + Interest
= R3 000 + (3% of R3 000)
= 3 000 + (3 ÷ 100 x 3 000)
= 3 000 + 90
= R3 090

EXAMPLE 4

Kerryn receives R3 200 for her birthday. She invests this money in a savings account that earns 8% p.a. simple interest. Calculate how much money will be in the account after 3 years.

Interest on R3 200 for 1 year = 8 ÷ 100 x R3 200
= R256
Interest on R3 200 for 3 years = 3 x R256
= R768
Money in the account after 3 years = R3 200 + R768
= R3 968

EXAMPLE 5

If Peter invested R1 600 and earned R80 interest on simple interest savings account, determine the interest rate used.

Interest rate = Interest ÷ Principal x 100
= R80 ÷ R1 600 x 100
= 5%

VAT CALCULATIONS

- 15% VAT charged on an item that costs R100, excluding VAT, equals R15
- Remember the following when doing VAT calculations:
- The VAT-exclusive amount is always equivalent to 100%.
- VAT is always equivalent to 15% of the VAT-exclusive amount.
- The VAT-inclusive amount is always equivalent to 115% of the VAT exclusive amount

EXAMPLE 1

Calculate 15% VAT:
Calculate 15% VAT on a VAT-exclusive amount of R300.

VAT = 15 ÷ 100 x R300

3.1   How much interest has she earned per year?
3.2   At what rate of interest was her money invested?

QUESTION 4
4.1   Calculate the VAT on each of the following VAT-exclusive amounts:
4.1.1. R260
4.1.2. R3 200
 4.2   Calculate the VAT-inclusive amount on each of the following VAT-exclusive amounts:
4.2.1. R1400
4.2.2 R38
4.3   Calculate the VAT-exclusive amount on each of the following VAT-inclusive amounts:
4.3.1 R11,99
4.3.2. R24,95

QUESTION 5
The till slip below shows purchases made at Checkers. Study the till slip and answer the following questions:

Checkers	
Willow Village, Tygervalley	
Tel: (021) 943 1480	
Tax Invoice No. 4420106777	
TEMPO 1EA	R5,79
BRW BREAD 700G	R10,99 *
TOMATO PILCHARDS 700G	R6,99 *
TOMATO PILCHARDS 700G	R6,99 *
GOVERRNMENT BAG 24L	R0,39
JAM SWISS ROLL	R16,99
GOVERRNMENT BAG 24L	R0,39
CARROT YNG PBAG	R5,99 *
TOMATO ROMA PP	R12,99 *
COTTAGE CHEESE	R16,99
L/F MILK BOTT 2L	R17,99 *
GRABOUW B/WORS	R27,58
12 BALANCE DUE	130.05
Cash Rounding	0.02
CHANGE	19.95

Rate	VAT	TOTAL
15%	8,89	68,13
*0,00%	0,00	61,94

C0092 #0041 11:27: 36 290721   S48385 R04
  Please keep your till slip as
      proof of purchase

5.1 How are the VAT-exempted items indicated on the slip?
5.2 Explain how the final amount the client must pay ('balance due') was calculated.
5.3 What is the total of the VAT-exempted goods?
5.4 What is the total of the goods that include VAT?
5.5 Calculate the VAT-exclusive amount by using the VAT-inclusive amount.

WORKED EXAMPLES

1. Study the following bank statement and answer the questions that follow:

BB Bank				
Account name:	Mr. PP Jonathan	Statement date:	30 May 2019	
Account Number:	1292113613	Frequency:	Monthly	
Type:	Current account	Statement period	30 April 2019 to	
Branch:	Claremont (129236)		30 May 2019	
		Overdraft limit:	R10 000	
		Interest on overdraft:		
		Up to R5 000:	9%	
		Above R5 000:	13,5%	
Date	Transaction details	Debits	Credits	Balance
2019-04-30	Opening balance			-R2 260,00
2019-05-01	Stop order – Rent	1500,00		-R3 760,00
2019-05-01	Debit order – Multichoice	225,00		-R3 985,00
2019-05-03	ATM cash withdrawal	200,00		-R4 185,00
2019-05-05	Debit transfer	420,00		R4 605,00
2019-05-08	Cash deposit (branch)		500,00	-R4 105,00
2019-05-09	ATM cash withdrawal	300,00		-R4 405,00
2019-05-12	Checkers – debit card purchases	530,00		-R4 935,00
2019-05-24	Credit transfer		1 000,00	-R3 935,00
2019-05-25	Interest	29,51		-R3 964,51
2019-05-29	Transaction fees	182,60		-R4 147,11
2019-05-29	Overdraft service fee	24,00		-R4 171,11
2019-05-29	Salary EFT deposit		10 500,00	R6 328,89
	Closing balance			R 328,89

   1.1.   What type of bank account is this?

   1.2.   What is the name of the bank?

   1.3.   What is name of the account holder?

   1.4.   Give the name of the branch and the branch code.

   1.5.   What is the time period represented by the statement?

   1.6.   What is the opening balance on the statement?

   1.7.   How many transactions were:

   1.7.1   EFT payments

   1.7.2 cash withdrawals at an ATM

   1.7.3   debit card purchases

   1.7.4 stop/debit orders

   1.8.   What was the total amount deposited into the account over this period?

   1.9.   Interest was calculated on the 25th of the month.

         1.9.1 What was the interest rate used?

         1.9.2 How much interest was charged?

   1.10   Determine the total bank charges for this period.

   1.11   What was the closing balance on the statement?

05/08/2019	Transaction charge	247,00–	1 526,00
13/08/2019	EFT transfer to Delicious Meal	1 400,00–	126,00
31/08/2019	Salary deposit	13 500,00	13 626,00
31/08/2019	Closing balance		13 626,00

1.1 What is the name of the account holder? (2)
1.2 What type of account is shown in the statement? (2)
1.3 For how many months is the statement? (2)
1.4 On what date was the first deposit made? How much was deposited into the account? (2)
1.5 If the account holder withdrew R2 400 on 02/09/2019 over the counter, what was the new balance? (4)

[12]

QUESTION 2

Ayanda works as a nurse in a hospital. She also has a tuck shop. She deposits money in her account and also withdraws to buy stock. Her statement for a certain period is shown below.
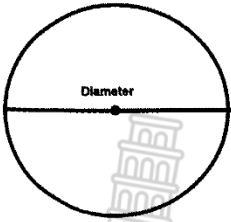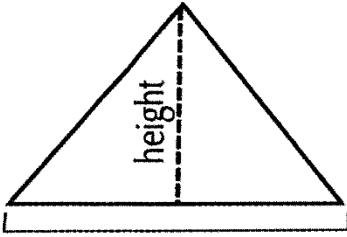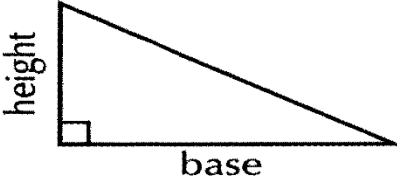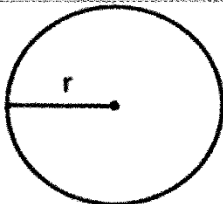
Ayanda Zulu, Number 15, 14th Street, Fordsburg 2092	PEOPLE'S BANK CURRENT ACCOUNT: 12345678910 31/08/2019

ACCOUNT STATEMENT STATEMENT PERIOD: 01/07/2019 – 31/08/2019

Date	Transaction description	Amount(R)	Balance(R)
01/07/2019	Opening balance	7 200,00	2 300,00
05/07/2019	Cash deposit	3 000,00 –	9 500,00
06/07/2019	Cash withdrawal at ATM	6,50–	6 500,00
06/07/2019	Transaction charge (fixed)	5 000,00–	6 493,50
18/07/2019	Cash withdrawal at counter		1 493,00
18/07/2019	Transaction charge	95,00–	1 398,00
31/07/2019	Salary deposit	13 500,00	A
31/07/2019	Administration fees	125,00–	14 773,00
05/08/2019	Cash withdrawal at counter	13 000,00–	1 773,00
05/08/2019	Transaction charge	247,00–	1 526,00
18/08/2019	EFT transfer to Hotel Leisure	1 400,00–	126,00
31/08/2019	Salary deposit	13 500,00	13 626,00
31/08/2019	Closing balance		13 626,00

2.1 On which date(s) was:
2.1.1 the statement requested (2)
2.1.2 the account credited the highest? (2)
2.2 How much more was Ayanda charged for withdrawing money over the counter, rather than withdrawing from the ATM? (2)
2.3. Determine the value of A, the balance on the 31/07/2019. (2)
2.4 What advice would you give Ayanda to reduce her bank charges? (2)

[10]

	Remember if you need to get the radius: Diameter ÷ 2 If the formula uses radius, you need to make sure you have the radius	
Triangle	$Perimeter = side + side + side$ *You will not be required to use Pythagoras in Maths Lit.* *You also need to remember that the perpendicular height is only found by a 90 ^{0} angle.*	$Area = \frac{1}{2} \times base \times \perp height$
SHAPE	**CIRCUMFERENCE**	**AREA**
Full circle	$2\,\pi\,r$	$\pi \times r^2$

For complex shapes:
- You will need to be able to complete calculations using more than one of the above shapes in one category.
- Always try and identify the shapes a complex diagram is made up of.
- Also remember that when we measure perimeter we measure the OUTSIDE distance around a shape only.
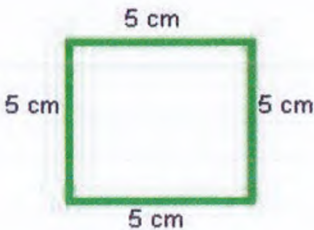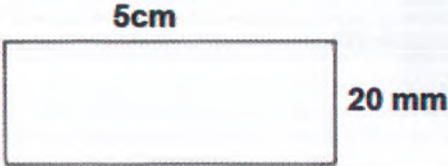
Let's look at some examples:

Remember that the formulae will be provided to you in any formal assessment.

1. For each of the diagrams below calculate the:
  i) perimeter in cm and
  ii)   area in cm²

WORKED EXAMPLES

Question:	Solution:
5 cm 5 cm 5 cm 5 cm	i)**Perimeter = side + side + side + side** $\quad$ 5+5+5+5 = 20 cm **OR** $\quad$ 5 x 4 = 20 cm ii) **Area = side × side** $\quad$ 5 x 5 = 25 cm² **or** $\quad 5^2 = 25$ cm²
5cm **20 mm**	i) Remember to convert first! So, 20 mm ÷10 = 2cm **Perimeter = (length × 2) + (width × 2)** = (5 x 2) + (2 x 2) = (10) + (4) = 14 ii) **Area = length × width** = (5 x 2) = 10 cm²
	i) **Perimeter = side + side + side** = (15 + 15 + 15) = 45 cm

QUESTION 2

Tayla is feeling creative. She is going to redo her Mom's garden. She drew her plan alongside:
The garden area is 6,5 m long and 4,5 m wide.
She needs to fence the area off as she is planning on placing a circular splash pool in the middle. For the fencing, she leaves a 40cm border on all sides.
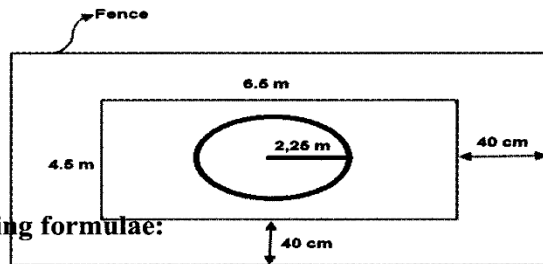
You may use the following formulae:

$$Perimeter = 2\,l + 2\,Width$$
$$Circumference\ of\ circle = 2\pi\,r$$
$$Area\ of\ a\ circle = \pi \times r^2$$
$$Area\ of\ a\ rectangle = l \times w$$

1.1 Calculate the length (in m) of fencing she willneed.
1.2 Calculate the area of the garden that will NOT betaken up by the splash pool.
1.3 Tayla wants to plant flowers along the length of thegarden (on both sides). These flowers need to be planted 25 cm apart to provide sufficient growing space. How many flowers will she need?
1.4 Tayla's friend calculated that the diameter of thepool is 5 m. Verify through calculation if this is correct.

QUESTION 3

Thina wants to have her bathroom retiled. She calculated that her bathroom has an area of 12but that she would only need tiles for 8,5m^2. Her floorplan is shown alongside:
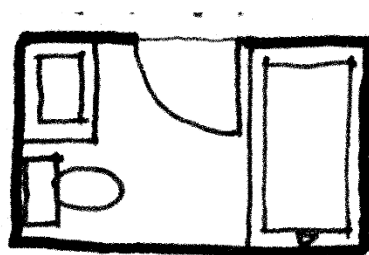
3.1 Why is the floor area and the area thatneeds to be tiled different?
3.2 If the tiles Thina want to use have measurements of 25 cm by 25 cm each,calculate the area of each tile in m^2.
3.3 How many of these tiles will Thina need to re-tile the floor? The tiles she wants to use are sold in boxesof 15 tiles at R 147,50 per box.

3.4 Calculate the cost of buying these tiles, to re-tile the bathroom.

SECTION D
TOPIC: MEASUREMENT

Sub-topics	VOLUME

RELATED CONCEPTS/ TERMS/VOCABULARY

Volume:
- The measure of the space occupied by a 3-dimensional object.

Unit:
- This refers to the measuring unit used (mm, cm, m).
- For volume your answer is in unit^3 (e.g.: mm^3; cm^3; m^3)
- Always read the question carefully and convert to the appropriate unit that the answer must bein, **BEFORE** starting your calculations.
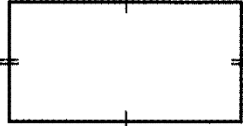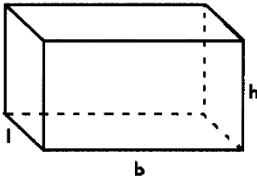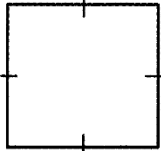
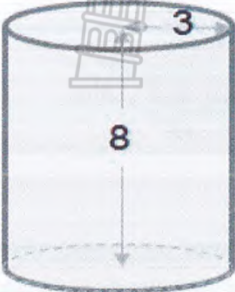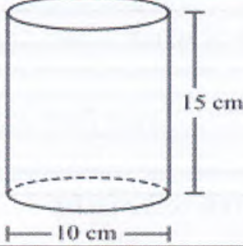| METHODOLOGY |
|---|
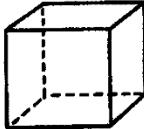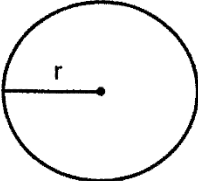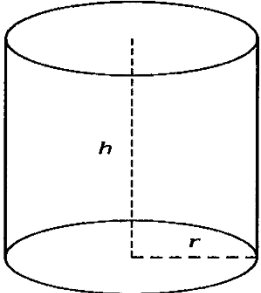
Formulae that will be provided to you:
 Last week you were provided with the formulae for perimeter and area. This week we will learn theformulae for volume.
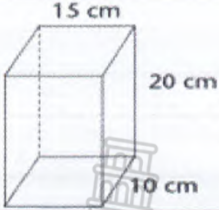
In the introduction above we mentioned that *volume* can be calculated for anything with *Length,width,* and *height.*

When you multiply *length* with *width* you get **area.**

So, if volume is *length x width x height*, it is basically the formula for *area* x *height of the object.*Let's look at a practical application of this by comparing the formulae for area to those for volume:

Shape:	Area:	Shape:	Volume:
Rectangle	*Area = length × width*	**Rectangular Prism:**	*Volume = length × width × height*
Square	*Area = side × side or : side²*	**Cube**	*Volume = side × side × side*
Circle	*Area = π × radius²*	**Cylinder**	*Volume = π x radius² × height*

15 cm, 20 cm, 10 cm	$Volume = length \times width \times height$ $= 15 \quad x \quad 10 \quad x \quad 20$ $= 3\ 000\ cm^3$
3, 8	$Volume = \pi \times radius^2 \times height$ $= 3{,}142 \times 3^2 \times 8$ $= 226{,}224\ cm^3$
15 cm, 10 cm	$Volume = \pi \times radius^2 \times height$ **Remember:** diameter $\div 2$ = radius So: $10 \div 2 = 5$ cm $Volume = \pi \times radius^2 \times height$ $= 3{,}142 \times 5^2 \times 15$ $= 1\ 178{,}25\ cm^3$

Question 2:

Most cooldrinks that we buy are sold in 330 ml cans. The diagram alongside indicates the dimensions of a standard tin.

You may use the formula:
$Volume = \pi \times radius^2 \times height$

115.2mm

66.3mm
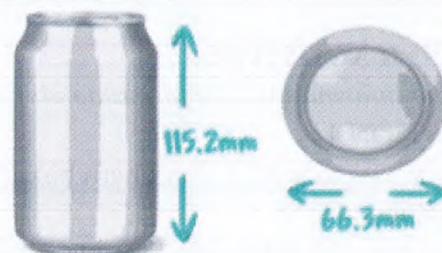
| Question:	Solution:
a) Use the information to calculate the volume of this tin in cm^3	Remember to look for the unit the question asked. So, height: $115{,}2 \div 10 = 11{,}52$ cm Diameter: $66{,}3 \div 10 = 6{,}63$ cm Radius: $6{,}63 \div 2 = 3{,}315$ cm $Volume = \pi \times radius^2 \times height$ $= 3{,}142 \times 3{,}315^2 \times 11{,}52$ $= 397{,}7642298\ cm^3$
b) Use the answer in (a) to determine if the can depicted in the question is a 330ml can or not, if $1cm^3 = 1\ ml$	$397{,}7642298\ cm^3 = 397{,}7642298 ml$ Therefore, it is not a 330ml can.

QUESTION 2

Water storage tanks are used often for irrigation or garden purposes. The tank advertised alongside is a 250 liter tank, with a diameter of 600mm and a height of 1000mm.

R846.00
250L
VERTICAL
STORAGE
WATER

Diameter

600mm

Height

1000mm
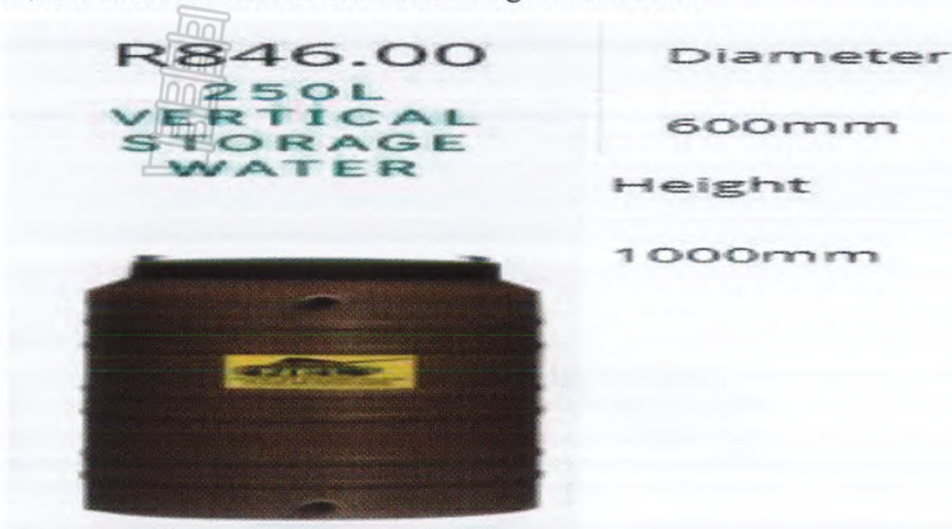
You may use the formula: $Volume = \pi \times radius^2 \times height$
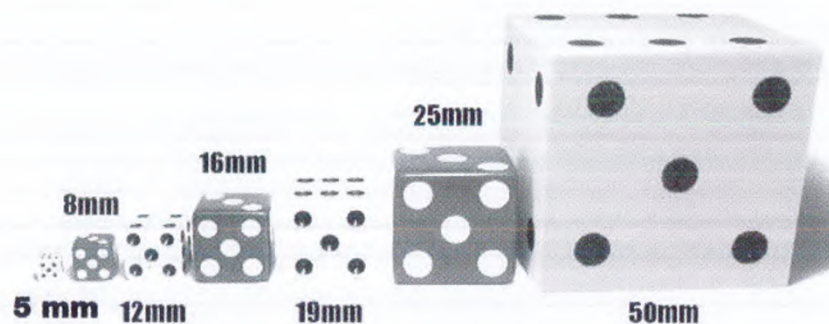
Explain what is meant by the term "volume".

2.1 Calculate the volume of this storage tank in m^3.

2.2 Verify through calculation if this is a 250 l watertank, if $1m^3 = 1\ 000$ liter.

QUESTION 3

Dice are often used in many games, and come in a variety of sizes, as can be seen below:

25mm

16mm

8mm

5 mm   12mm   19mm   50mm

3.1 Why is there only one measurement provided for every dice?

3.2 Calculate the difference in volume between the biggest and smallest dice in mm^3.
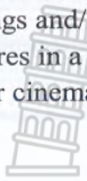
You may use the formula: Volume = side x side x side

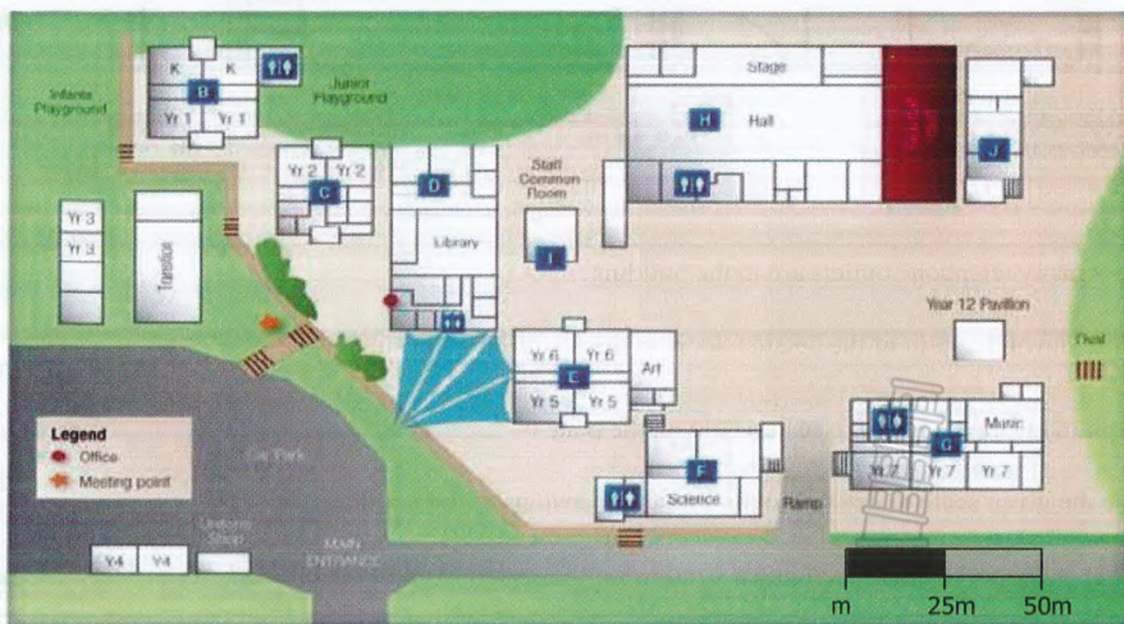| SECTION E			
TOPIC	**MAPS AND PLANS**	**SECTION**	Maps

RELATED CONCEPTS/ TERMS/VOCABULARY

- seating plan and/or layout for a classroom
- layout of buildings and/or sports fields at a school
- layout of the stores in a shopping Centre
- Seating plans for cinemas and/or sports fields.

- A map is a picture that shows a shrunken image of an area of land; for example, the map above shows a picture of the whole of South Africa. A map always shows the image as seen from above, that is, as seen from the sky

WORKED EXAMPLES

- describe the position of an object in relation to surrounding objects
- describe the position of a building in relation to surrounding buildings
- find locations, follow directions and develop directions for travelling between two or more locations
- estimate distances using measurement and a given scale.

TOPIC		MAPS AND PLANS	SECTION		Scale

RELATED CONCEPTS/ TERMS/VOCABULARY

The "scale" of a map describes how many times smaller an object shown on a map or plan is than its actual size; or how many times bigger the actual size of the object is compared to the picture of the object shown on the map or plan. There are two main scales that we work with on maps, namely number scales and bar scales.

Number scale
- A number scale is written in ratio format, for example 1: 200. This means the picture on the map or plan is 200 times smaller than the actual size of the object.
- No units (mm, cm, etc.) are included on the number scale because the relationship in size between the original and the scaled objects remains the same. This means that every 1 mm measured on the map or plan is equal to 200 mm in actual length, or every 1 cm on the plan is equal to 200 cm in actual length.

Disadvantage of a number scale

If the size of the map is changed (for example, through photocopying), then the scale of the map is no longer accurate. For this reason, some maps contain a bar scale.

The advantage and disadvantage of a bar scale

Advantage: if the size of the map/plan is changed, then the picture of the bar scale will change in the same proportion and so the scale will still be accurate.

Disadvantage: it requires more work than a number scale: i.e. you first have to determine the relationship between a length measured on the bar and actual distance before you can use the scale to estimate actual distances on the map.

METHODOLOGY WITH WORKED EXAMPLES

Suppose a map of a school has been drawn on the scale 1: 1500.

1.1 If you measure 12, 5 cm on the map, how far will this be in actual distance in the school?

Answer:

According to the scale, every length on the map is 1 500 times smaller than its actual length.
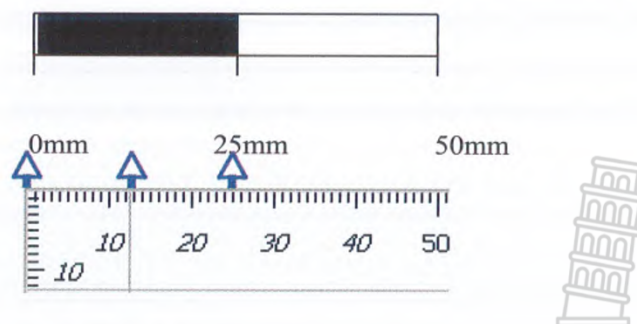
The length measured on the map = 12, 5 cm.

The actual length = 1 500 times bigger than measured length

= (12,5 × 1 500) cm

= 18 750 cm

= 187, 50 m (we convert to metres).

1.2 Estimating distance using a bar scale

Suppose the following scale was given with Map 1:

ELECTRICAL PLAN

LEGEND

Ceiling mounted light

Duplex Receptacle outlet

Telephone outlet

smoke detector

Switch

N

Scale: 1 : 200

1.   How many telephone outlets are in the building?   (2)

2   Write down the ratio of the outside doors to the inside doors in simplest form.   (3)

3   Explain the meaning of the scale 1:200 on the plan.   (2)

4   Use the given scale to determine the actual dimensions of the building.   (3)

5   What is the probability of finding a window on the eastern wall of the offices?   (2)

4. 6 windows
5. 5 doors
6. A child will sleep in the smaller bedroom and an adult in the larger bedroom. Adults usually have more clothes and shoes and other personal belongings than children, and therefore need more space.
7. Bath, toilet and wash basin.
8. Couch, chair, TV set, flower decoration, dining table and three chairs.
9. No. There is no window in the smaller room, the door from the passage to the lounge should be between the sitting area and the dining area and not so close to the table (in fact, there need not be a wall between the passage and the lounge), and space is wasted at the end of the passage.
10. 1, 8 cm = 2 m on the bar scale. Length of house on plan = 8,6 cm. Actual length = 2 m × 8,6 ÷ 1,8 ≈ 10 m
    Width of house on plan = 6,5 cm. Actual width = 2 m × 6,5 ÷ 1,8 ≈ 7 m

LEARNER ACTIVITIES 2

The seating plan below represents the seating arrangement in a coach of a train.

Key:
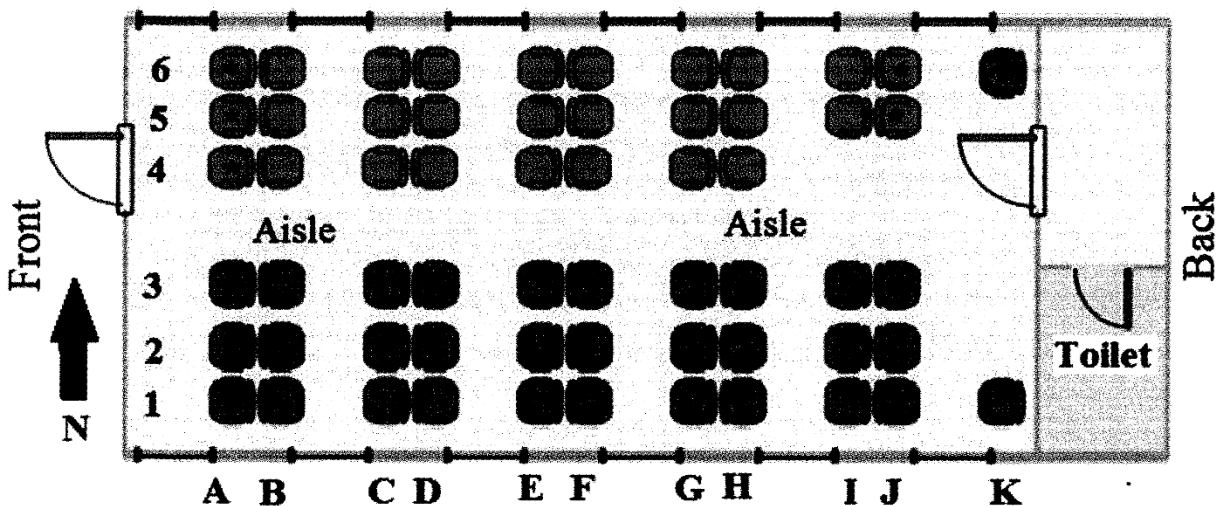
●—————●	Window
(door symbol)	Door
■	Seat without power socket
▮	Seat with a power socket

Use the information above to answer the questions that follow.

1   How many passengers can be seated in ONE coach?

2   Write down the number of the seat close to the window and the toilet.

3   In which general direction is the toilet from seat B6?