MATHEMATICS
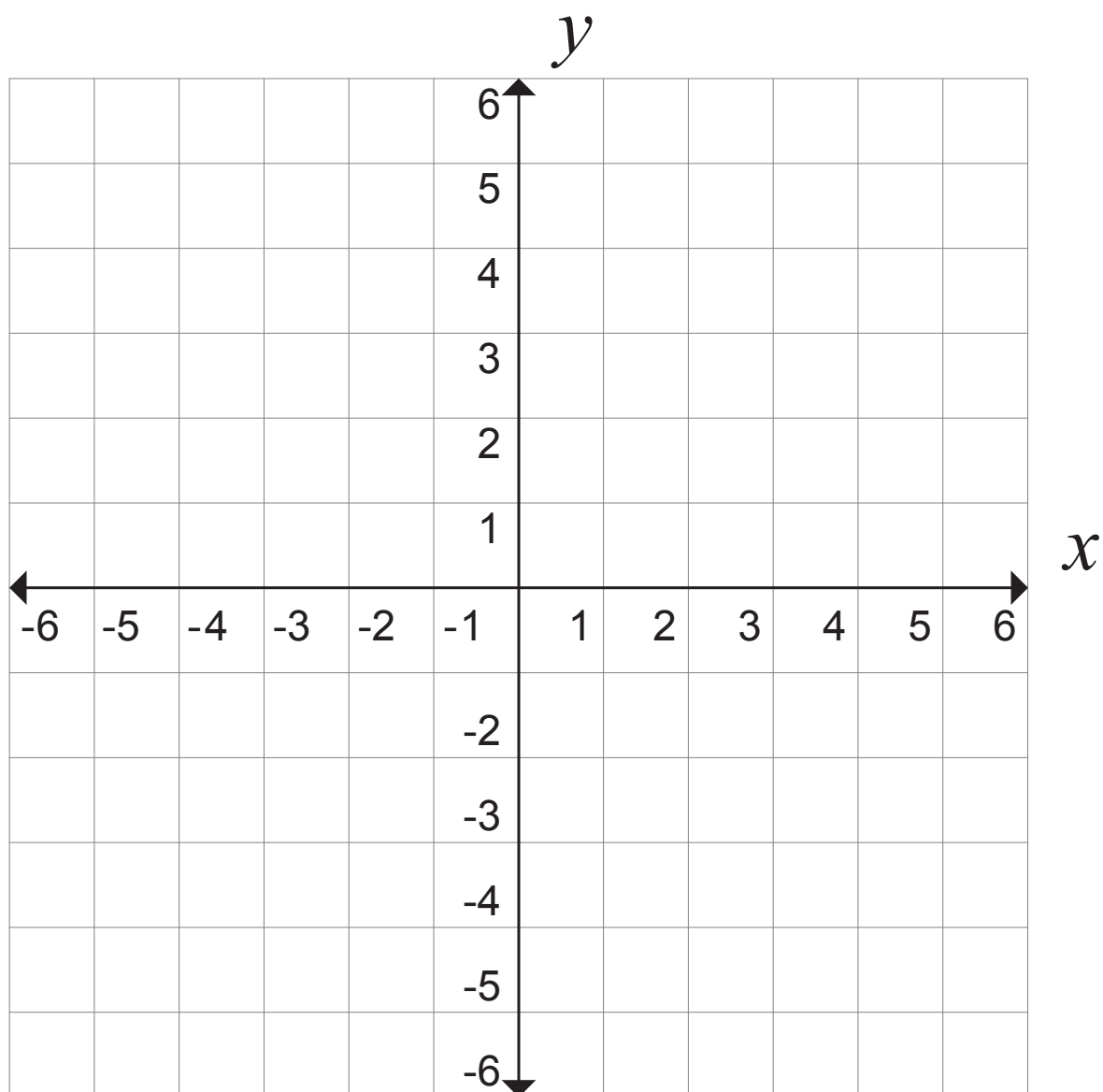## RESOURCE PACK
GRADE 10 TERM 3

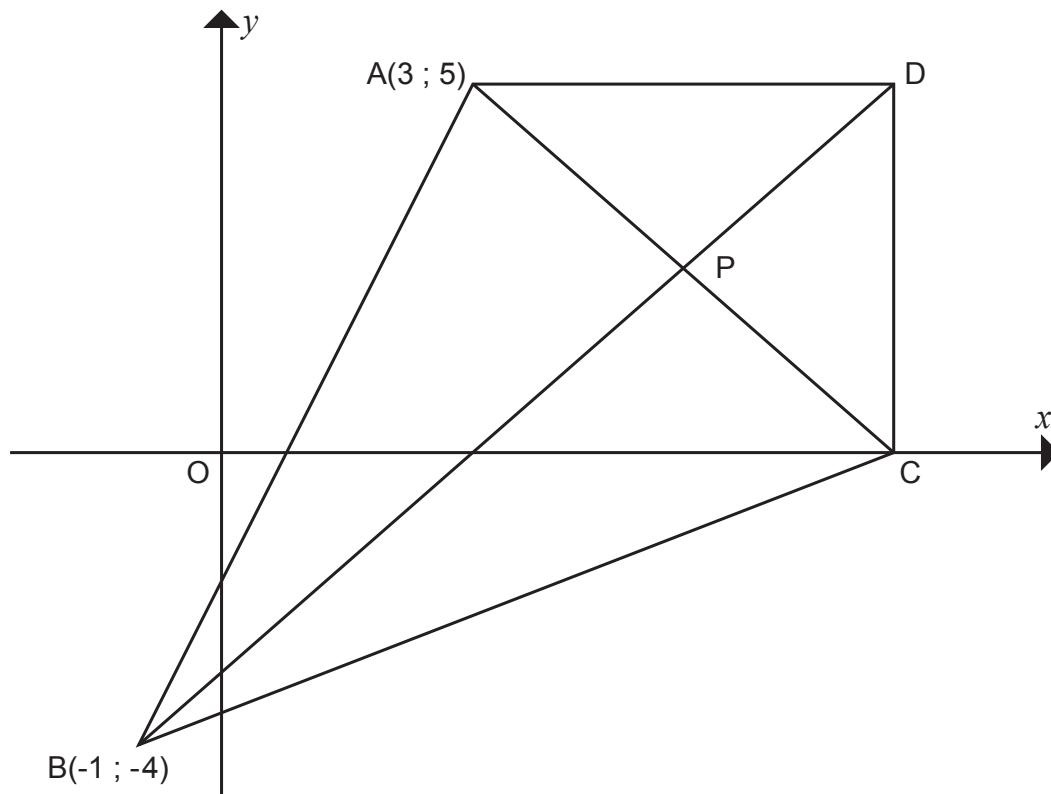# ANALYTICAL GEOMETRY

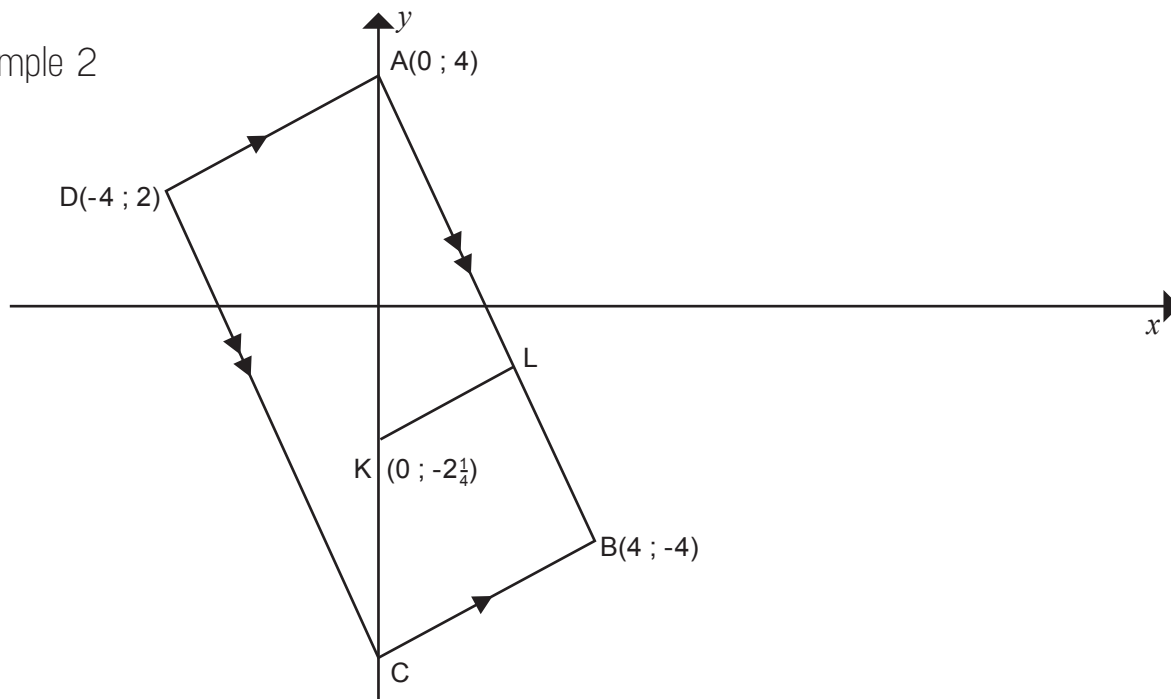## RESOURCE 1

TOPIC 1 LESSON 1

RESOURCE 2

TOPIC 1 LESSON 4

Example 1

Example 2

RESOURCE 3

TOPIC 2 LESSON 2

FINANCE AND GROWTH

INVESTIGATION – SIMPLE INTEREST AND COMPOUND INTEREST

Name: _____   Class: _____

This investigation will lead you to a better understanding of the difference between simple interest and compound interest.

1. Suppose your friend invests R1 000 that earns simple interest of 5% per annum.
    Complete the following table to find what your friend will have saved after 10 years.
    The first two years have been completed for you.

Number of years	Principal amount	Interest rate	Interest total	Final (accumulated) amount
1	R1 000	0,05	R50	R1 050
2	R1 000	0,05	R50	R1 100
3				
4				
5				
6				
7				
8				
9				
10				

2. Someone told you that compound interest is better than simple interest when saving money. You decide to try it out instead of following your friend. The main difference with compound interest is that earn you interest on the interest you have earned. So, if you earn R100 interest in the first year the bank will even give you interest on that R100. Sounds good!

Complete the table:

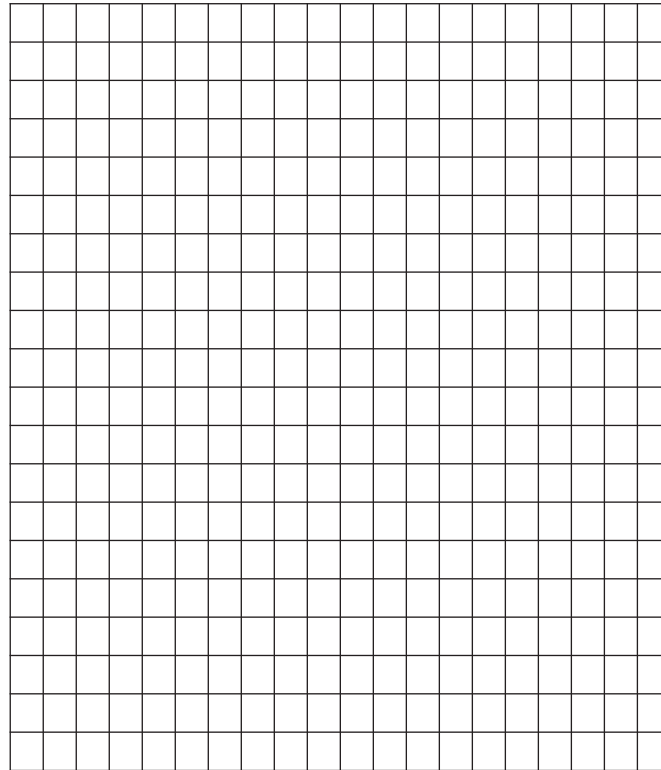| Number of years	Principal amount	Interest rate	Interest total	Final (accumulated) amount
1	R1 000	0,05	R50	R1 050
2	R1 050	0,05	R52,50	R1 102,50
3	R1 102,50	0,05	R53,13	R1 157,63
4	R1 157,63			
5				
6				
7				
8				
9				
10				

3. Complete the table below summarising how much is available in each savings account at the beginning of the savings plan (0 years) then at the end of each year.

Year	Simple Interest	Compound Interest
Start (0)	(0 ; 1 000)	(0 ; 1 000)
1	(1 ; 1 050)	(1 ; 1 050)
2	(2 ; 1 100)	(2 ; 1 102,50)
3		
4		
5		
6		
7		
8		
9		
10	(10 ;)	(10 ;)

4. Use the grid provided to draw graphs of your friend's savings plan and your own. The horizontal axis should represent time and the vertical axis should represent the total amount after each year. Plot all 11 points.

It is recommended that your vertical axis goes up in 50s from the initial amount of 1 000. Although it will be difficult to judge exactly where each point lies (particularly when decimals are involved), you can just estimate.

5. What kind of relationship is there between amount and time on the graph representing simple interest?

    _____

6. What kind of relationship is there between amount and time on the graph representing compound interest?

    _____

7. Explain in your own words what the main difference is between the two types of interest.

FINANCE AND GROWTH - MEMORANDUM

INVESTIGATION – SIMPLE INTEREST AND COMPOUND INTEREST

Name: _____   Class: _____

This investigation will lead you to a better understanding of the difference between simple interest and compound interest.

1. Suppose your friend invests R1 000 that earns simple interest of 5% per annum.
   Complete the following table to find what your friend will have saved after 10 years.
   The first two years have been completed for you.

Number of years	Principal amount	Interest rate	Interest total	Final (accumulated) amount
1	R1 000	0,05	R50	R1 050
2	R1 000	0,05	R50	R1 100
3	**R1 000**	**0,05**	**R50**	**R1 150**
4	**R1 000**	**0,05**	**R50**	**R1 200**
5	**R1 000**	**0,05**	**R50**	**R1 250**
6	**R1 000**	**0,05**	**R50**	**R1 300**
7	**R1 000**	**0,05**	**R50**	**R1 350**
8	**R1 000**	**0,05**	**R50**	**R1 400**
9	**R1 000**	**0,05**	**R50**	**R1 450**
10	**R1 000**	**0,05**	**R50**	**R1 500**

2. Someone has told you that compound interest is better than simple interest when saving money. You decide to try it out instead of following your friend. The main difference with compound interest is that you earn interest on the interest you have earned. So, if you earn R100 interest in the first year the bank will even give you interest on that R100. Sounds good!

Complete the following table:

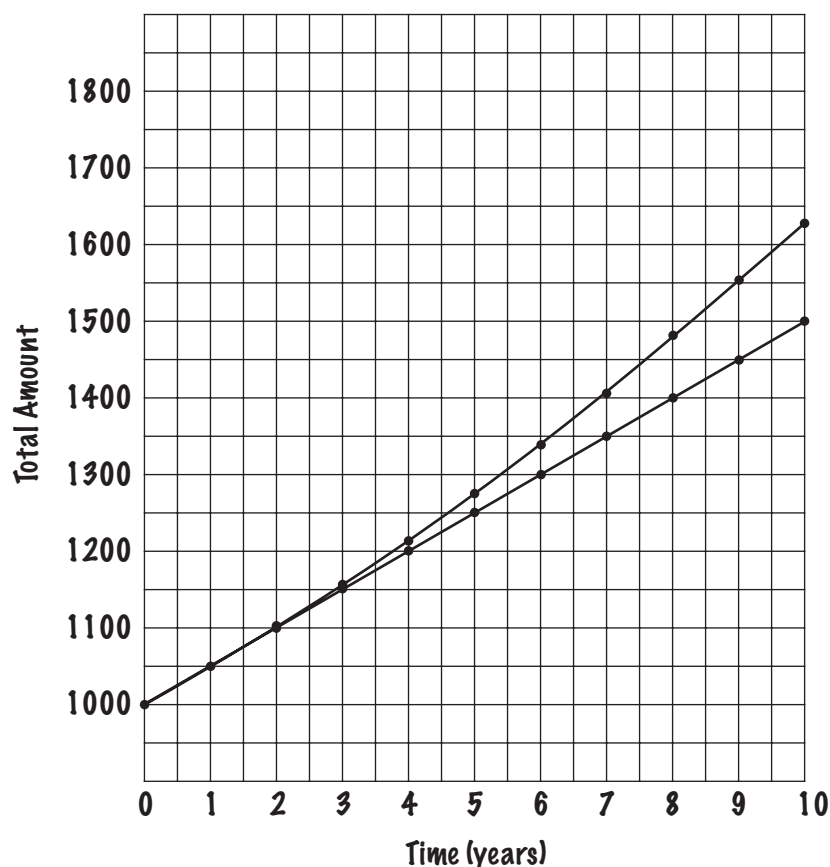| Number of years	Principal amount	Interest rate	Interest total	Final (accumulated) amount
1	R1 000	0,05	R50	R1 050
2	R1 050	0,05	R52,50	R1 102,50
3	**R1 102,50**	**0,05**	**R55,13**	**R1 157,63**
4	**R1 157,63**	**0,05**	**R57,88**	**R1 215,51**
5	**R1 215,51**	**0,05**	**R60,78**	**R1 276,29**
6	**R1 276,29**	**0,05**	**R63,81**	**R1 340,10**
7	**R1 340,10**	**0,05**	**R67,01**	**R1 407,11**
8	**R1 407,11**	**0,05**	**R70,36**	**R1 477,47**
9	**R1 477,47**	**0,05**	**R73,87**	**R1 551,34**
10	**R1 551,34**	**0,05**	**R77,57**	**R1 628,91**

3. Complete the table below summarising how much is available in each savings account at the beginning of the savings plan (0 years) then at the end of each year.

Year	Simple Interest	Compound Interest
Start (0)	(0 ; 1 000)	(0 ; 1 000)
1	(1 ; 1 050)	(1 ; 1 050)
2	(2 ; 1 100)	(2 ; 1 102,50)
3	**(3 ; 1 150)**	**(3 ; 1 157,63**
4	**(4 ; 1 200)**	**(4 ; 1 215,51)**
5	**(5 ; 1 250)**	**(5 ; 1 276,29)**
6	**(6 ; 1 300)**	**(6 ; 1 340,10)**
7	**(7 ; 1 350)**	**(7 ; 1 407,11)**
8	**(8 ; 1 400)**	**(8 ; 1 477,47)**
9	**(9 ; 1 450)**	**(9 ; 1 551,34)**
10	**(10 ; 1 500)**	**(10 ; 1 628,91)**

4. Use the grid provided to draw graphs of your friend's savings plan and your own. The horizontal axis should represent time and the vertical axis should represent the total amount after each year. Plot all 11 points.

It is recommended that your vertical axis goes up in 50s from the initial amount of 1 000.
Although it will be difficult to judge exactly where each point lies (particularly when decimals are involved), you can just estimate.

5. What kind of relationship is there between amount and time on the graph representing simple interest?

   Linear

6. What kind of relationship is there between amount and time on the graph representing compound interest?

   Exponential

7. Explain in your own words what the main difference is between the two types of interest.

Simple interest only takes the initial amount into account
Compound interest takes the interest you keep earning into account.

RESOURCE 4

LESSON 4: INFLATION AND GROWTH

Pick'nPay
Discount & FAMILY Supermarkets

We've got WHATEVER YOU WANT in 2006

Chicken pieces 21^{89} EACH

Orange Juice 9^{95} EACH

Cold drink sixpack 16^{75} EACH

Flora margerine 9^{49} EACH

Ice Cream 2 litres 18^{99}

Salad dressing 10^{95} EACH

Yoghurt sixpack 16^{79}

Bokomo Weet-Bix 8^{99} EACH

Spekko rice 2 kg 7^{59}

White/brown bread 3^{75} EACH

Five Roses teabags 13^{95}

Long life milk 1l 5^{75} EACH

RESOURCE 5

LESSON 4

2006 vs 2018

	2006	2018
Flora margarine	R9,49	R30,99
Weetbix	R8,99	R24,99
Five Roses tea	R13,95	R36,99

Longlife milk		
	R5,75	R13,99
White bread		
	R3,75	R12,99
Speko Rice		
	R7,59	R13,99

https://www.thesouthafrican.com/then-and-now-food-prices-in-south-africa-compared-to-10-years-ago/

RESOURCE 6

LESSON 4

HOW COSTS HAVE SOARED

THE PRICE HIKE SUPERMARKET
****
Price comparison of some basic
consumer goods from 2003-2017

2003

• Frisco coffee **750g** was	R19.99
• Rama margarine **500g** was	R6.99 ●
• Tastic rice **per kg** was	R7.32
• Rainbow chicken **per kg** was	R12.99 ●

2011

• Frisco coffee **750g** was	R45.99
• Rama margarine **500g** was	R9.89
• Tastic rice **2kg** was	R17.99
• Rainbow chicken **2kg** was	R29.99

2017

• Frisco coffee **750g** at	R78.99
• Rama margarine 500g at	R24.99
• Tastic rice 2kg at	R22.00
• Rainbow chicken 2kg at	R51.99

****

● = Where items are on sale

Disclaimer: some prices are based on items on sale at the time.
Prices were taken from different shopping outlets

Source: pricecheck.co.za | nda.agri za | guzzle.co.za

RESOURCE 7

LESSON 4

In 2000, shoppers now paid **44 times more** for basic groceries than they did in 1970.

An investigation revealed that it is no exaggeration when the older generation complains about how little R20 can buy today, compared to 30 years ago.

We compared food prices. Our shopping basket consisted of:

- Two litres of full cream milk
- 750g of a cheaper brand of instant coffee
- a loaf of brown bread
- 500g of cheddar cheese
- 500g of apricot jam
- 100g slab of chocolate
- a toilet roll
- 12 extra-large eggs
- 500g of rice
- 500g of butter
- 500g of beef mince

1970 = R 3,24
2000 = R 145,19

RESOURCE 8

LESSON 4

CARS

1970

R1 575

2000

R48 000

https://www.iol.co.za/news/south-africa/it-was-cheaper-to-eat-in-the-good-old-days-68928

RESOURCE 9

LESSON 4

1995 was the year South Africa won the Rugby World Cup, the Constitutional Court abolished capital punishment, and Nelson Mandela was one year into his presidency.

Things have changed significantly since then. In 1995, the rand traded at less than R4 to the US Dollar – its current level sits around R12.

1995 VS 2015

Petrol per Litre		
1995		**2015**
R1,88		R13,77
95 Unleaded		95 Unleaded

Internet Access		
1995		**2015**
R29 + time on internet		R399
56k dial-up + cost of calls		Telkom 2Mbps ADSL
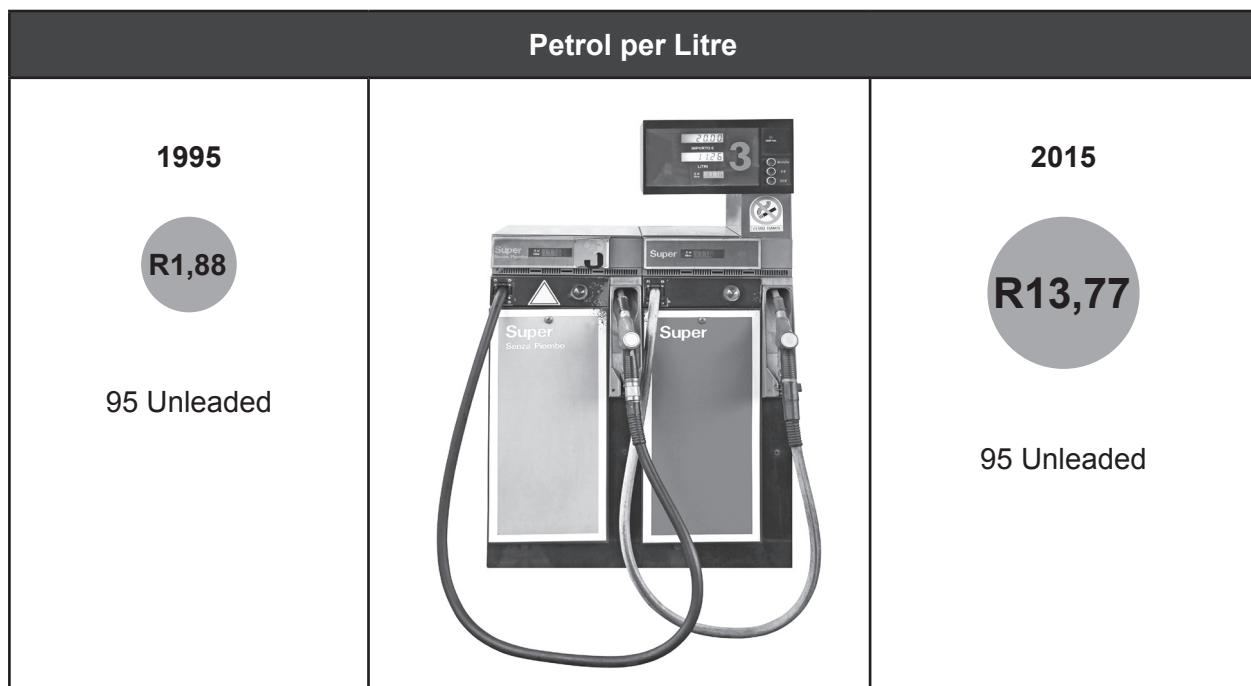
Cellular Calls

1995

99c

Cost per minute
on Vodacom

2015

R1,75

Cost per minute
on Vodacom

Mobile phone

1995

R2,295

Nokia 2110

2015

R8,500

Samsung Galaxy S6

Big Mac

1996

R7,00

Price per burger

2015

R25,50

Price per burger

RESOURCE 10

LESSON 4

2005 vs 2015

Entry-level ADSL

2005 Price	2015 Price
R449	**R165**
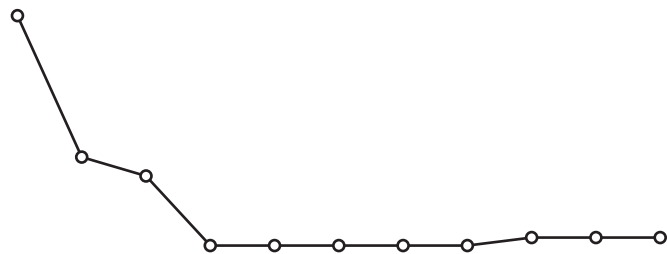
DStv Premium

2005 Price	2015 Price
R379	**R665**
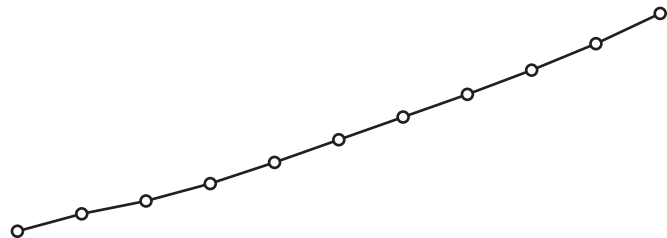
2GB Vodacom Data

2005 Price	2015 Price
R1 198	**R99**
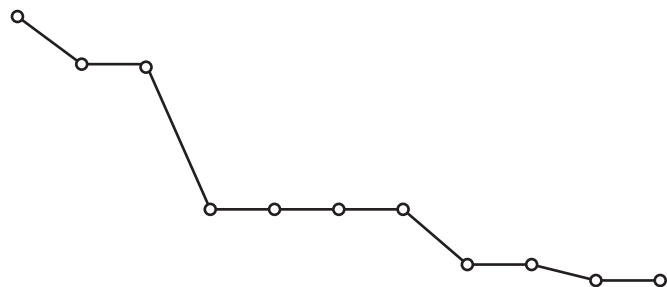
Vodacom OOB per MB	
	2005 Price **R2** 2015 Price **R2**
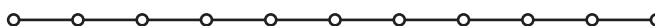
Big Mac	
	2005 Price **R19,95** 2015 Price **R25,50**

Petrol	
	2005 Price **R4,22** 2015 Price **R11,02**

https://mybroadband.co.za/news/technology/133698-prices-in-south-africa-1995-versus-2015.html
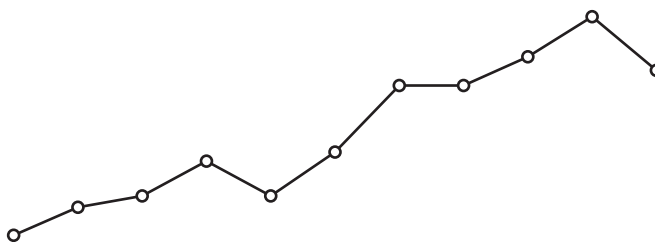
RESOURCE 11

LESSON 4

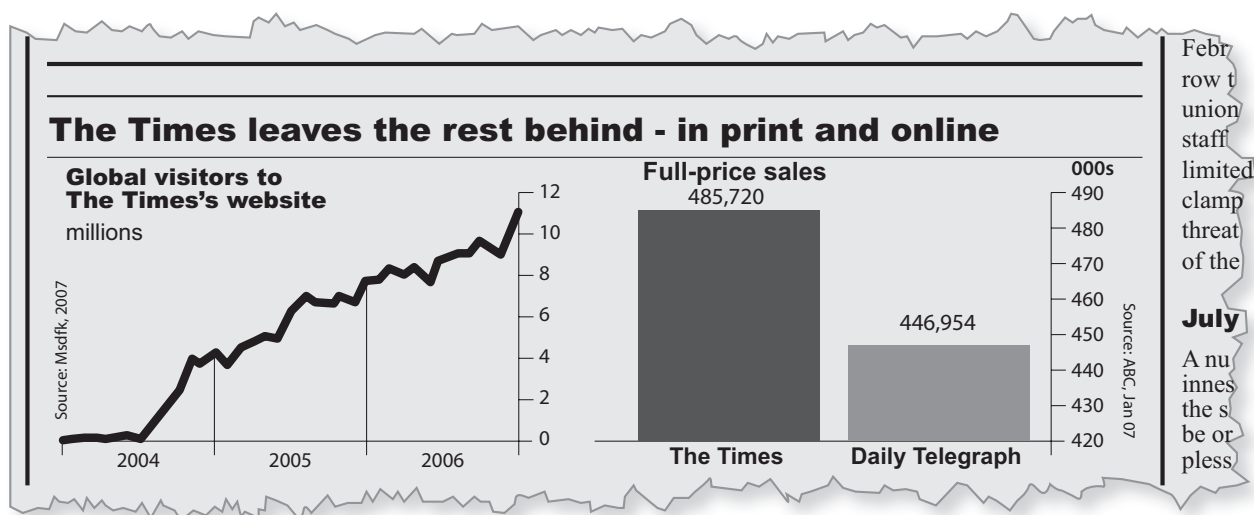### THE PRICE OF BREAD IN SA FROM 1960 TO 2016

1960 **9c**   1970 **9c**   1980 **9c**

2010 **R4.68**   2000 **R2.70**   1990 **R1.12**

2016 **R10.20**

https://citizen.co.za/news/1074715/the-price-of-bread-from-1960-to-2016/
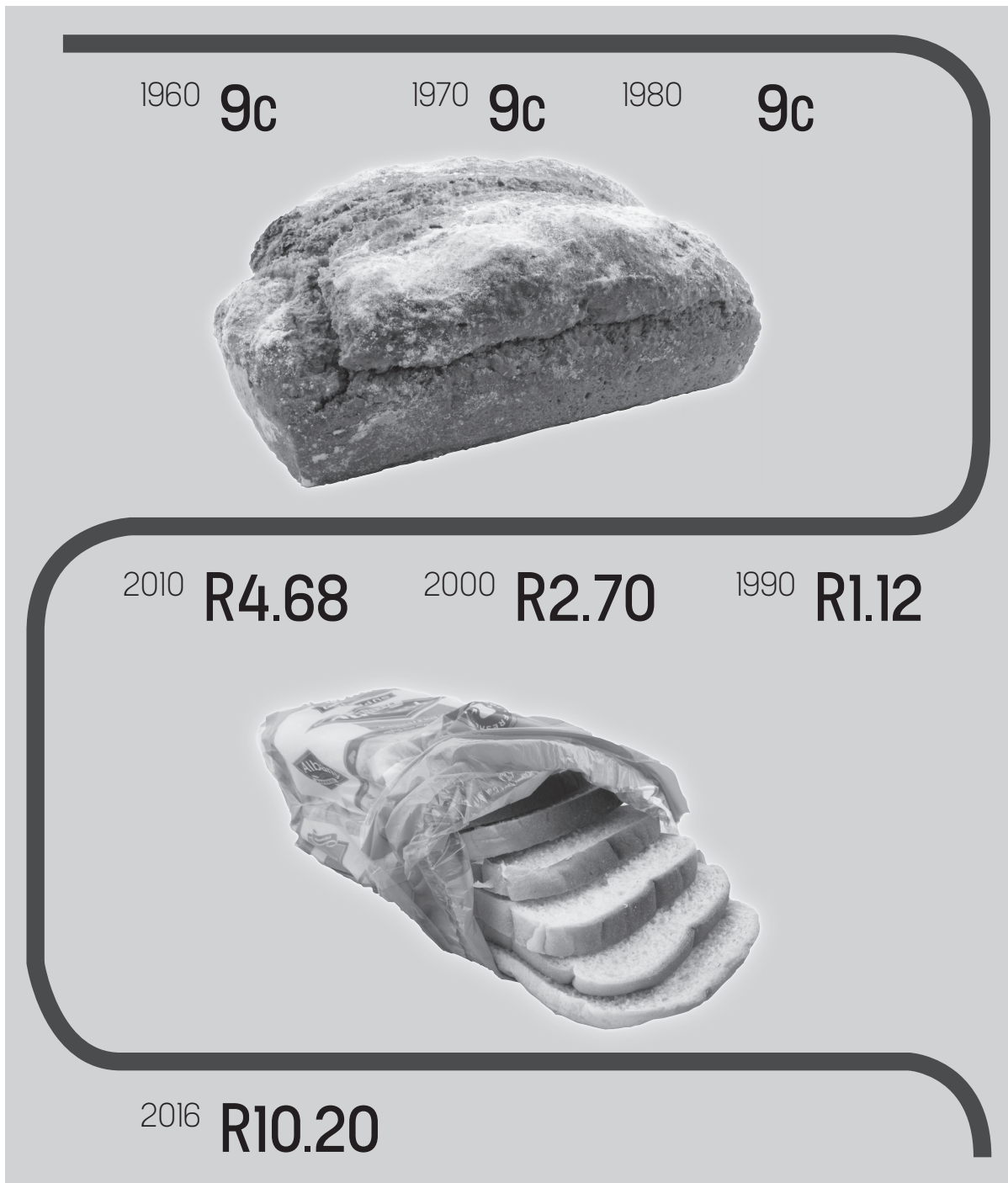
RESOURCE 12

LESSON 4

STATISTICS

The Times leaves the rest behind - in print and online

Global visitors to The Times's website — millions (Source: Msdfk, 2007)

Full-price sales (000s) — The Times 485,720; Daily Telegraph 446,954 (Source: ABC, Jan 07)

"MASSIVE INCREASE IN HOUSE PRICES THIS YEAR!"

Average house prices (£) — 1998, 1999 — Year

Average house prices (£) — 1998, 1999 — Year
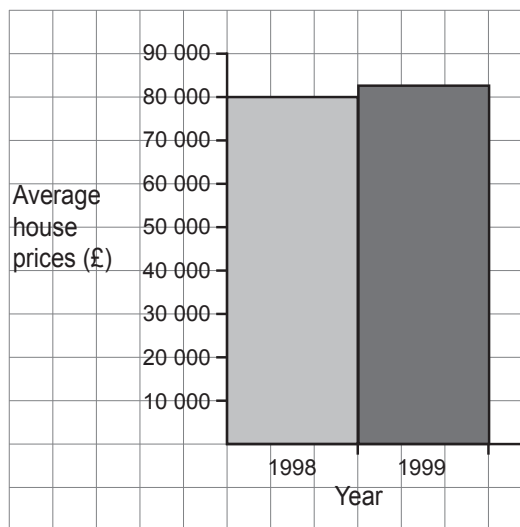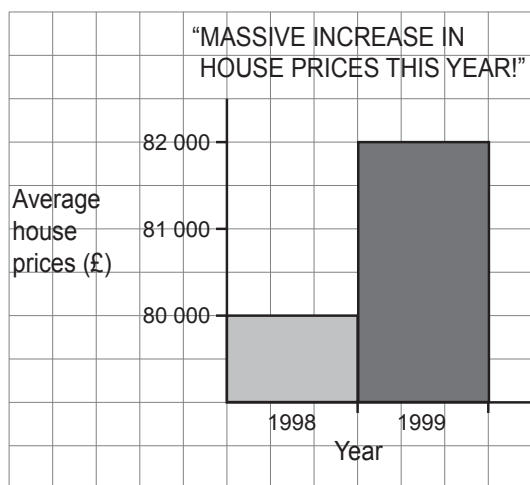
RESOURCE 13

TOPIC 3 LESSON 1

Gun deaths in South Africa

2009 = **6,428** killed
per day

1998 = **12,298** killed
per day

Murder by firearm

33%
• **5,513** of the **16,834** people were murdered by firearm
per day

Globally **UN estimates**
42% of **murders** are committed with a firearm

1998 **2009**
49.4% **33%**

GUNS & VIOLENCE IN SOUTH AFRICA

Men & Women

Men: shot and killed
5,711
89%

Women: shot and killed
717
11%

Suicides

Men: suicide
687
88%

Women: suicide
93
12%

Femicide

Women are most likely to be killed by an intimate partner
1999: 4 women per day
2009: 3 women per day

Gun dealers

2000 **90%** **2006**
720 **80**

Gun owners

1999: 2,027,411 **9%** **2011: 1,845,032**
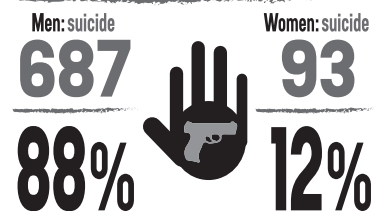
TRIGONOMETRY

RESOURCE 14

TOPIC 4 LESSON 1

TRIG WORKSHEET

1. Label the sides of the triangle below (opposite, adjacent, hypotenuse) according to the angle θ:
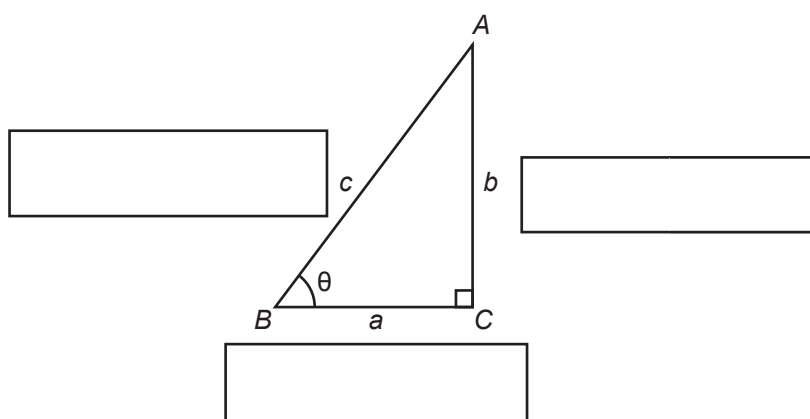
2. Complete the following table using the triangle below:

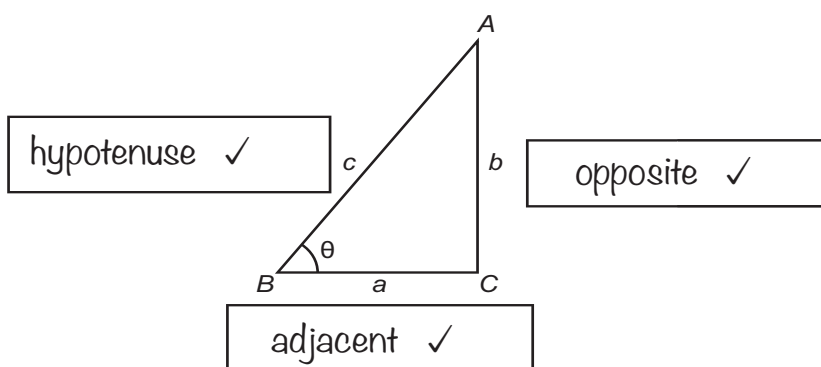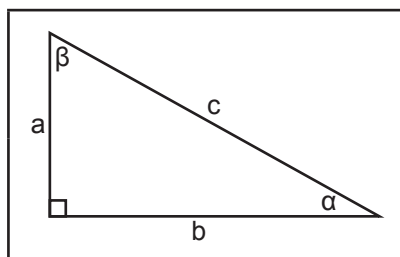| $\tan \alpha =$	$\cos \alpha =$	$\tan \beta =$
$\sin \beta =$	$\sin \alpha =$	$\cos \beta =$
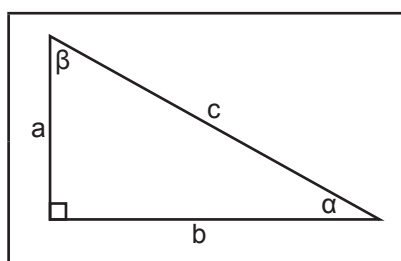
3. Using the diagram below, write down TWO possible ratios for:
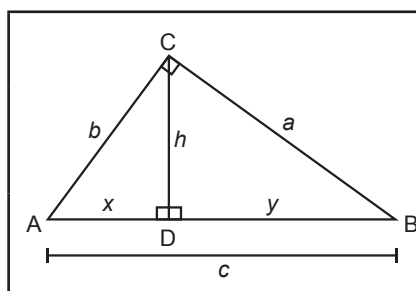
   tan B sin A cos B

   1.

   2.

RESOURCE 14

TOPIC 4 LESSON 1

TRIG WORKSHEET MEMORANDUM

1. Label the sides of the triangle below (opposite, adjacent, hypotenuse) according to the angle θ:

hypotenuse ✓

opposite ✓

adjacent ✓

2. Complete the following table using the triangle below:

$\tan\alpha = \dfrac{a}{b}$ ✓	$\cos\alpha = \dfrac{b}{c}$ ✓	$\tan\beta = \dfrac{b}{a}$ ✓
$\sin\beta = \dfrac{b}{c}$ ✓	$\sin\alpha = \dfrac{a}{c}$ ✓	$\cos\beta = \dfrac{a}{c}$ ✓

3. Using the diagram below, write down TWO possible ratios for:
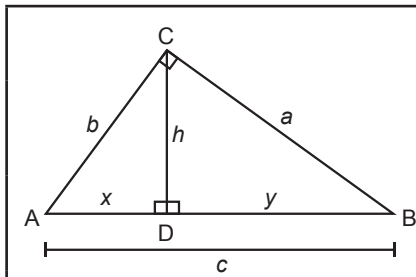
	tan B	sin A	cos B
1.	$\dfrac{b}{a}$ ✓	$\dfrac{a}{c}$ ✓	$\dfrac{a}{c}$ ✓
2.	$\dfrac{h}{y}$ ✓	$\dfrac{h}{b}$ ✓	$\dfrac{y}{a}$ ✓

Note: The first row (1) represents the bigger triangle that the angle is in.

The second row (2) represents the smaller triangle that the angle is in.

EUCLIDEAN GEOMETRY

RESOURCE 15

TOPIC 5 LESSON 1

$A = B$ and $B = C$ $\therefore$ _____	$A + B = 180^0$ and _____ $\therefore$ $B = C$
$A = B + C$ and $B = C$ $\therefore$ _____	$A = B + C$ and $A = P + C$ $\therefore$ _____
$P = Q + R$ and _____ $\therefore Q = S$	$C = F$ and _____ $\therefore C = D$
$A + B = 180^0$ and $C = A$ and $D = B$ $\therefore$ _____	$C + D = 90^0$ and _____ $\therefore A + D = 90^0$
$A + C = 180^0$ and _____ $\therefore A = B$	$A = B + C$ $B = Q + R$ and $C = Q$ $\therefore$ _____

Possible answers:

$A = B$ and $B = C$ $\therefore A = C$	$A + B = 180^0$ and $A + C = 180^0$ $\therefore B = C$
$A = B + C$ and $B = C$ $\therefore A = 2B$ or $A = 2C$	$A = B + C$ and $A = P + C$ $\therefore B = P$
$P = Q + R$ and $P = S + R$ $\therefore Q = S$	$C = F$ and $F = D$ $\therefore C = D$
$A + B = 180^0$ and $C = A$ and $D = B$ $\therefore C + D = 180^0$ Also, acceptable: $C + B = 180^0$ $A + D = 180^0$	$C + D = 90^0$ and $C = A$ $\therefore A + D = 90^0$
$A + C = 180^0$ and $B + C = 180^0$ $\therefore A = B$	$A = B + C$ $B = Q + R$ and $C = Q$ $\therefore A = R$
Explanation of the last question: If $\quad A = B + C$ Then $\quad A - C = B$ And $\quad B = Q + R$ $\therefore A - C = Q + R$ But $\quad C = Q$ $\quad \therefore A = R$	

RESOURCE 16

Grade 10   MATHEMATICS   Term 3

LESSON 5 LESSON 1

Example 1
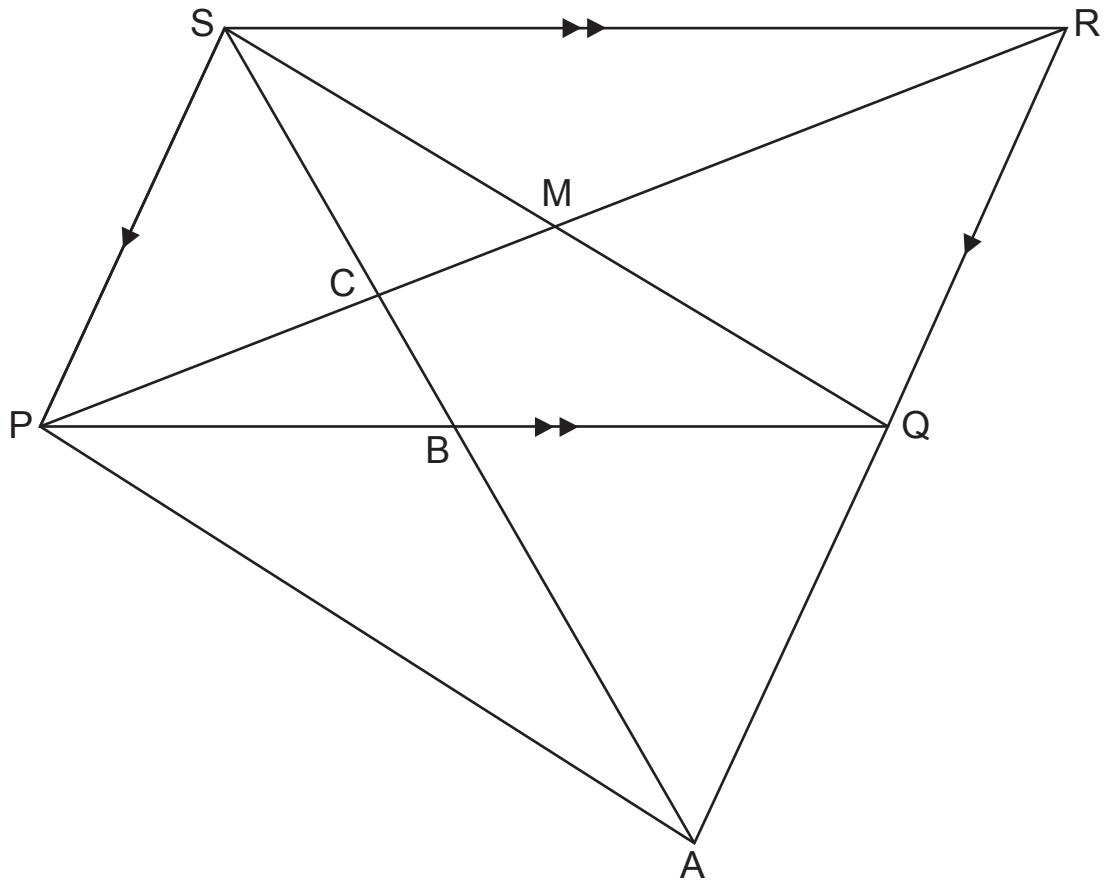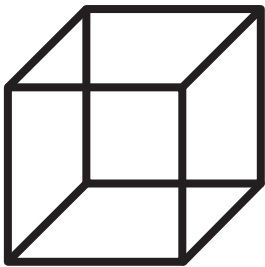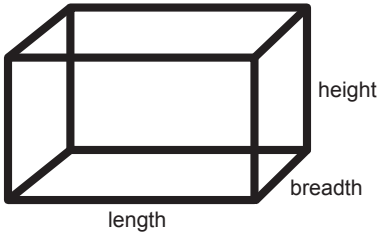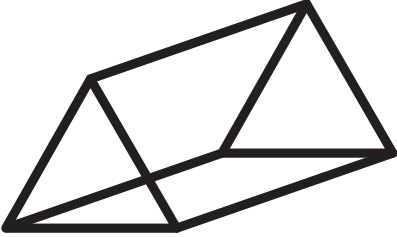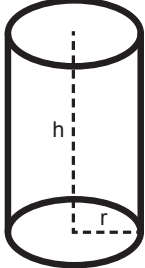
Example 2
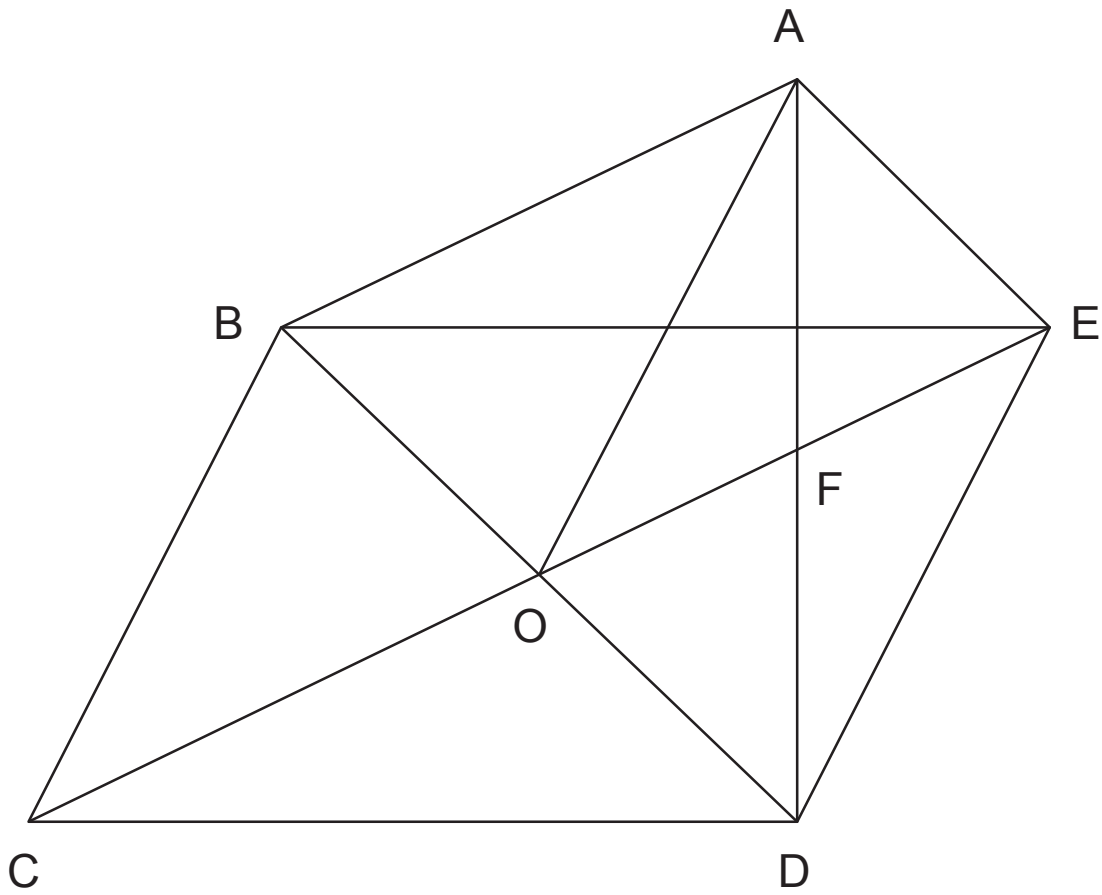
MEASUREMENT

RESOURCE 17

TOPIC 6 LESSON 1

RESOURCE 18

TOPIC 6 LESSON 2

THE EFFECT ON VOLUME WHEN MULTIPLYING ANY DIMENSION BY A CONSTANT FACTOR K.

Consider the following rectangular prism:

2 cm

5 cm

10 cm

Complete the following table:

Dimensions:	LENGTH	BREADTH	HEIGHT	VOLUME	VOLUME COMPARISON TO ORIGINAL
ORIGINAL	10cm	5cm	2cm	100cm³	-----------------
ONE dimension is 2 times bigger (your choice which one)					
TWO dimensions are 2 times bigger (your choice which two)					
ONE dimension is 3 times bigger (your choice which one)					
TWO dimensions are 3 times bigger (your choice which two)					

Write the following numbers as products of their prime factors in simplest exponential form:

(Example: $25 = 5^2$)	4 = _____	9 = _____

Complete the following table, taking ALL 3 dimensions into account:

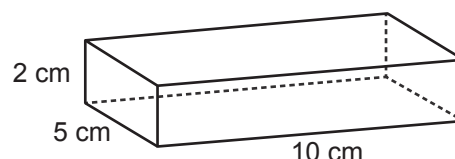| Dimensions:	LENGTH	BREADTH	HEIGHT	VOLUME	VOLUME COMPARISON TO ORIGINAL
ORIGINAL	10cm	5cm	2cm	100cm³	-----------------
Each dimension is 2 times bigger					
Each dimension is 3 times bigger					
Each dimension is $\frac{1}{2}$ the length					
Each dimension is 5 times bigger					

As a group, think of a general rule as to what happens to the volume when one, two or all the dimensions are changed. If possible, use k as a general term for the change. Each of you must write the ideas that you come up with in your book, ready to discuss with your teacher.

RESOURCE 18

TOPIC 6 LESSON 2

THE EFFECT ON VOLUME WHEN MULTIPLYING ANY DIMENSION BY A CONSTANT FACTOR *K*. MEMORANDUM

Consider the following rectangular prism:

2 cm
5 cm
10 cm

Complete the following table:

Dimensions:	LENGTH	BREADTH	HEIGHT	VOLUME	VOLUME COMPARISON TO ORIGINAL
ORIGINAL	10cm	5cm	2cm	100cm^3	----------------
ONE dimension is 2 times bigger (your choice which one)	**20cm**	**5cm**	**2cm**	**100cm^3**	**2 times bigger**
TWO dimensions are 2 times bigger (your choice which two)	**20cm**	**10cm**	**2cm**	**400cm^3**	**4 times bigger**
ONE dimension is 3 times bigger (your choice which one)	**30cm**	**5cm**	**2cm**	**300cm^3**	**3 times bigger**
TWO dimensions are 3 times bigger (your choice which two)	**30cm**	**15cm**	**22cm**	**900cm^3**	**9 times bigger**

Write the following numbers as products of their prime factors in simplest exponential form:

(Example: 25 = 5^2)	4 = **2^2**	9 = **3^2**
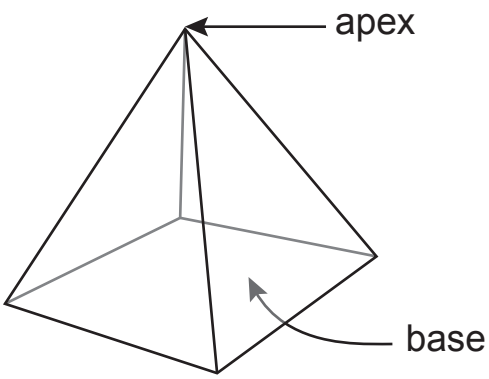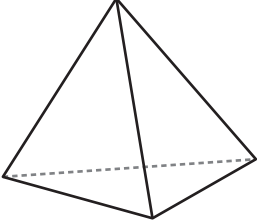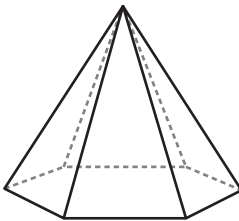
Complete the following table, taking ALL 3 dimensions into account:

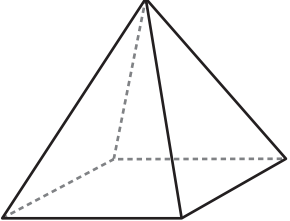| Dimensions:	LENGTH	BREADTH	HEIGHT	VOLUME	VOLUME COMPARISON TO ORIGINAL
ORIGINAL	10cm	5cm	2cm	100cm³	-----------------
Each dimension is 2 times bigger	**20cm**	**10cm**	**4cm**	**100cm³**	**8 times bigger**
Each dimension is 3 times bigger	**30cm**	**15cm**	**6cm**	**27 000cm³**	**27 times bigger**
Each dimension is $\frac{1}{2}$ the length	**5cm**	**2,5cm**	**1cm**	**12,5cm³**	**8 times smaller ($\frac{1}{8}$ times the volume)**
Each dimension is 5 times bigger	**50cm**	**25cm**	**10cm**	**12 500cm³**	**125 times bigger**
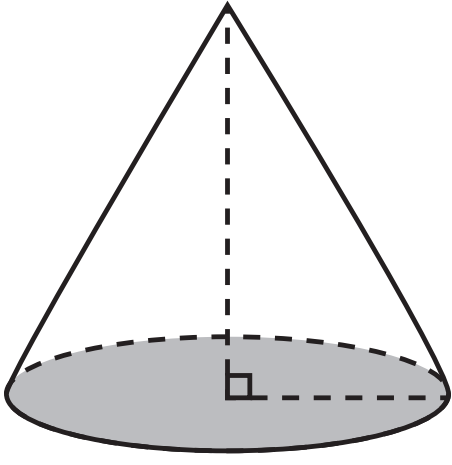
RESOURCE 19

TOPIC 6 LESSON 3

PYRAMIDS

apex

base

square-based pyramid

triangular-based pyramid

hexagonal-based pyramid

CONES

SPHERE
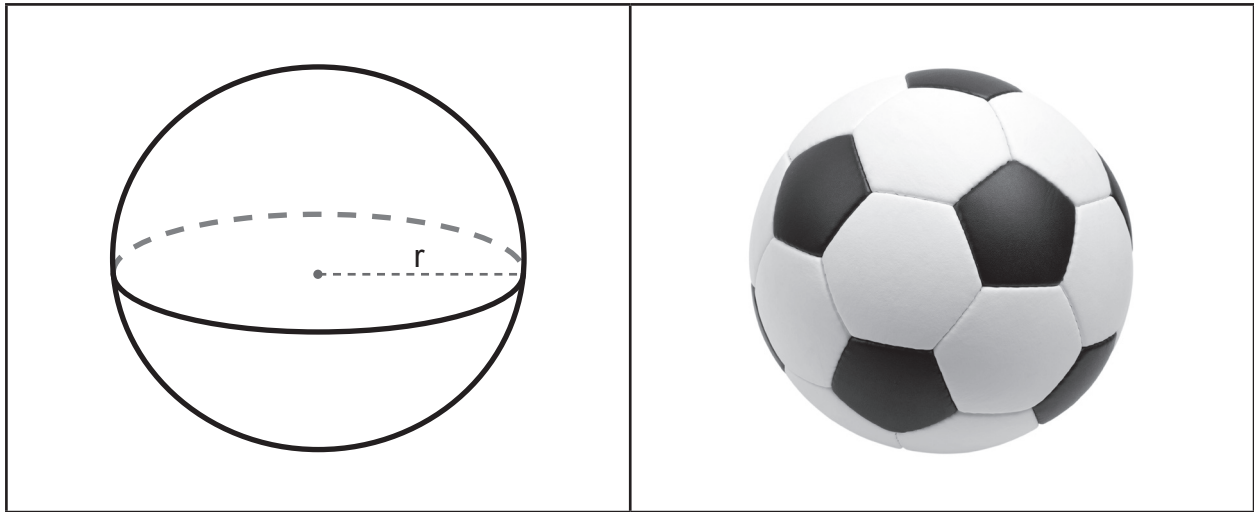
CONE AND HEMISPHERE

RESOURCE 20

TOPIC 6 LESSON 3

Example 1:
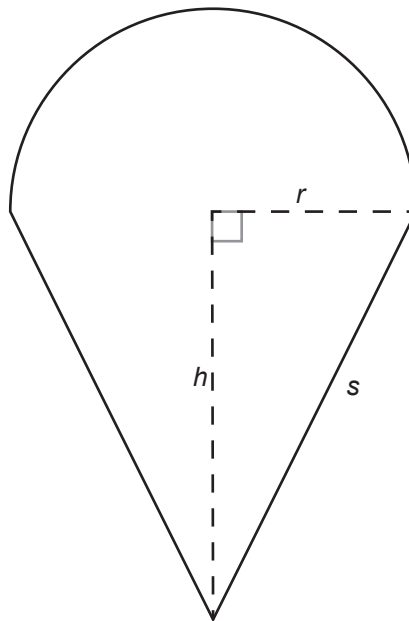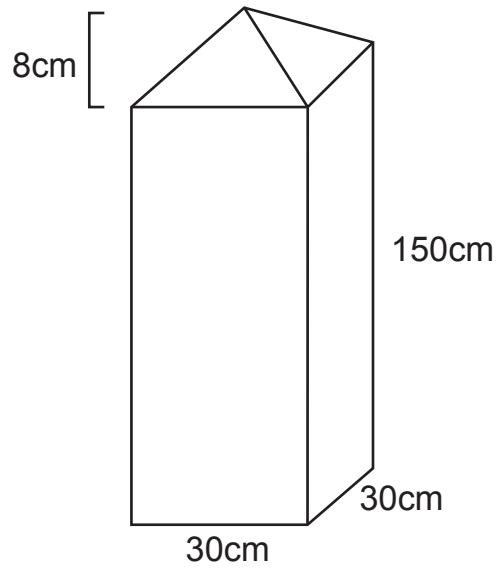
MATHEMATICS
ASSESSMENTS
GRADE 10 TERM 3

ASSESSMENT: TERM 3 TEST 1

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1	Analytical Geometry	17	
2	Statistics	17	
3	Finance	16	
	TOTAL	50	

QUESTION 1   **17 MARKS**

In the diagram below, $ABCD$ is a quadrilateral with $A(-3;1), B(2;3), C(k;1)$ and $D(-1;-1)$.
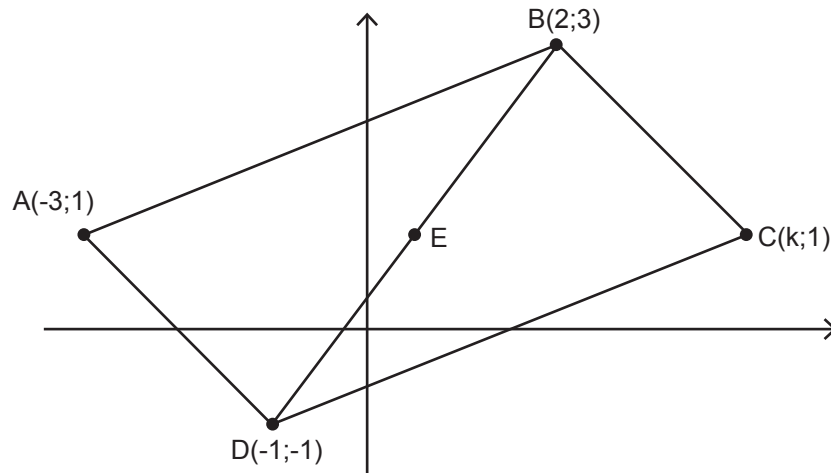
1.1 Determine the length of line AB. Leave your answer in surd form.   (3)

1.2 Determine the gradient of line AB.   (2)

1.3 Determine the coordinate of E, if E is the midpoint of BD.   (3)

1.4 If AB is parallel to CD, determine the value of k.   (3)

1.5 Is triangle ABD a right angled triangle? Prove your answer.   (6)

QUESTION 2   **17 MARKS**

2.1   The speeds (in km/h) of two race cars were recorded and are given in the table below:

Car A	125	84	101	124	132	115	145	90	101
Car B	102	123	124	99	108	130	107	20	117

     2.1.1   Determine the mean speed of Car A.   (2)

     2.1.2   Determine the mode speed of Car A.   (1)

     2.1.3   Draw a box and whisker diagram to represent the data for Car A.   (6)

     2.1.4   Which measure of central tendency (mean, median, mode) best describes the data
            for Car B, motivate your answer.   (2)

2.2   The number of cappuccino's a coffee shop sold over the course of a month is summarised
     in the table below:

Cappuccino's sold	Frequency
$0 \leq x < 10$	2
$10 \leq x < 20$	5
$20 \leq x < 30$	6
$30 \leq x < 40$	17

     2.2.1   Determine the modal class.   (1)

     2.2.2   Determine the interval in which the median lies.   (2)

2.3   Tino has written four math's tests this year. The marks he achieved are as follows: 66%,
     75%, 81%, and 84%. How much must he get (in percent) for his next test if he wants an
     average of 80% for all five tests.   (3)

QUESTION 3   **16 MARKS**

3.1 Look at the advert below for a new fridge:

Cash Price
R4 999

or
Hire Purchase
10% deposit and R500 per month
for 2 years.

3.1.1 Determine how much the 10% deposit will be.   (2)

3.1.2 If you take the hire purchase agreement, determine the total cost of the fridge.   (2)

3.1.3 Determine how much interest you will pay in total.   (2)

3.1.4 Determine the total interest rate.   (2)

3.1.5 Is it better to pay cash or take the hire purchase agreement?
        Motivate your answer.   (2)

3.2 Tumi wants to buy a pair of shoes that are sold only in America.
     The shoes cost $50 and the current exchange rate is $1 = R12.

3.2.1 How much will the shoes cost in rand?   (1)

3.2.2 Tumi decides to only buy the shoes in 2 years' time, however, over that time period
        the following changes have taken place:

   •   Inflation has caused the price of the shoes to increase by 8% **per year**.

   •   The exchange rate has also dropped to R11 per dollar.

   Determine how much the shoes will cost in 2 years' time in rand.   (5)

RESOURCE 22

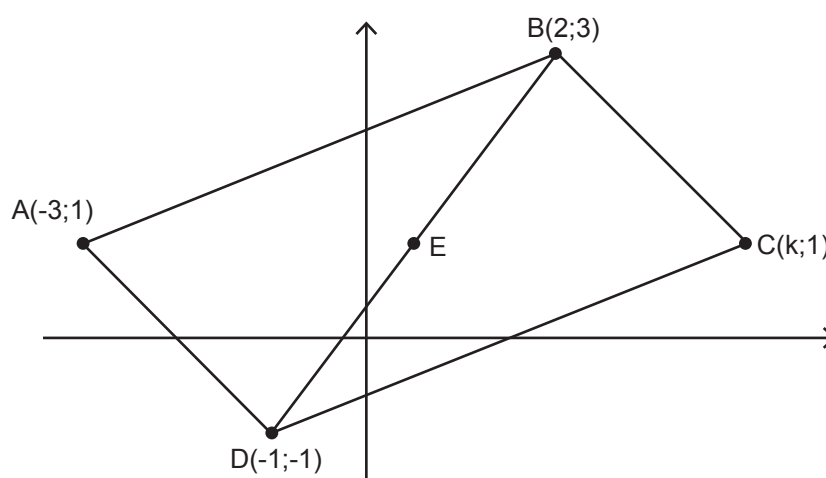## ASSESSMENT: TERM 3 TEST 1 MEMORANDUM

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1	Analytical Geometry	17	
2	Statistics	17	
3	Finance	16	
	TOTAL	50	

QUESTION 1   **17 MARKS**

In the diagram below, $ABCD$ is a quadrilateral with $A(-3;1), B(2;3), C(k;1)$ and $D(-1;-1)$.

1.1 Determine the length of line AB. Leave your answer in surd form.   (3R)

$$AB = \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$$

$$AB = \sqrt{(2 + 3)^2 + (3 - 1)^2} \checkmark$$

$$AB = \sqrt{25 + 4} \checkmark$$

$$AB = \sqrt{29} \text{ units} \checkmark$$

1.2 Determine the gradient of line AB. (2R)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$m = \dfrac{3 - 1}{2 + 3}$ ✓

$m = \dfrac{2}{5}$ ✓

1.3 Determine the coordinate of E, if E is the midpoint of BD. (3R)

$E\left(\dfrac{x_1 + x_2}{2}; \dfrac{y_1 + y_2}{2}\right)$

$E\left(\dfrac{2 - 1}{2}; \dfrac{3 - 1}{2}\right)$ ✓✓

$E\left(\dfrac{1}{2}; 1\right)$ ✓

1.4 If AB is parallel to CD, determine the value of k. (3C)

$m = \dfrac{y_2 - y_1}{x_2 - x_1}$

$\dfrac{2}{5}$ ✓ $= \dfrac{1 + 1}{k + 1}$ ✓

$2k + 2 = 10$

$k = 4$ ✓

1.5 Is triangle ABD a right angled triangle? Prove your answer. (6P)

If it is a right-angled triangle then $AB \perp AD$ or $AB \perp BD$ or $AD \perp BD$,

$m_{AB} = \dfrac{2}{5}$ $\qquad m_{AD} = \dfrac{1 + 1}{-3 + 1} = -1$ ✓✓ $\qquad m_{BD} = \dfrac{3 + 1}{2 + 1} = \dfrac{4}{3}$ ✓✓

$m_{AB} \times m_{AD} \neq -1 \qquad m_{AB} \times m_{BD} \neq -1 \qquad\qquad m_{AD} \times m_{BD} \neq -1$ ✓

Therefore it is not a right angled triangle. ✓

This question can also be done by finding the length of all the sides, and showing that Pythag does not hold.

QUESTION 2   **17 MARKS**

2.1 The speeds (in km/h) of two race cars were recorded and are given in the table below:

Car A	125	84	101	124	132	115	145	90	101
Car B	102	123	124	99	108	130	107	20	117

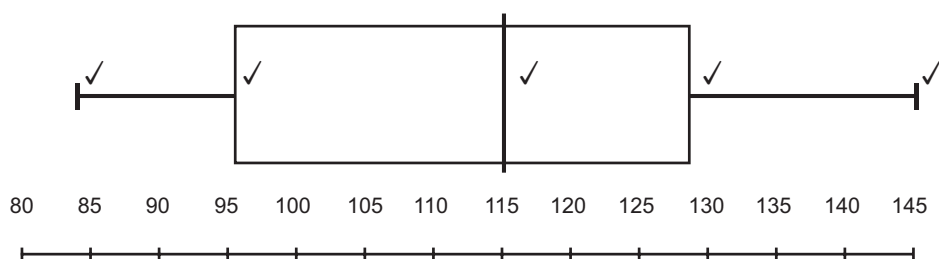2.1.1 Determine the mean speed of Car A.   (2R)

mean =113 km/h✓ ✓

2.1.2 Determine the mode speed of Car A.   (1K)

mode =101 km/h✓ ✓

2.1.3 Draw a box and whisker diagram to represent the data for Car A.   (6C)

84,90,101,101,115,124,125,132,145 ✓

2.1.4 Which measure of central tendency (mean, median, mode) best describes the data for Car B, motivate your answer.   (2K)

Median ✓ , there is an outlier of 20km/h ✓

2.2 The number of cappuccino's a coffee shop sold over the course of a month is summarised in the table below:

Cappuccino's sold	Frequency
$0 \leq x < 10$	2
$10 \leq x < 20$	5
$20 \leq x < 30$	6
$30 \leq x < 40$	17

2.2.1 Determine the modal class.   (1K)

$30 \leq x < 40$✓

2.2.2 Determine the interval in which the median lies.   (2K)

$30 \leq x < 40$✓✓

2.3 Tino has written four math's tests this year. The marks he achieved are as follows: 66%, 75%, 81%, and 84%. How much must he get (in percent) for his next test if he wants an average of 80% for all five tests. (3P)

$$80 = \frac{66 + 75 + 81 + 84 + x}{5} \checkmark$$

$$400 = 306 + x \checkmark$$

$$x = 94 \checkmark$$

QUESTION 3   16 MARKS

3.1 Look at the advert below for a new fridge:

Cash Price
R4 999
or
Hire Purchase
10% deposit and R500 per month
for 2 years.

3.1.1 Determine how much the 10% deposit will be. (2R)

R4 999 × 10%✓ = R499✓

3.1.2 If you take the hire purchase agreement, determine the total cost of the fridge. (2R)

R500 × 24 = R12 000✓

R12 000 + R499 = R12 499✓

3.1.3 Determine how much interest you will pay in total. (2R)

R12 499 - R4 999 = R7 500✓✓

3.1.4 Determine the total interest rate. (2R)

$$\frac{7\,500}{12\,499} \times 100 = 60\%$$

3.1.5 Is it better to pay cash or take the hire purchase agreement? K
Motivate your answer. (2)

Cash is better ✓ , R7500 of interest is more than the value of the fridge. ✓

3.2 Tumi wants to buy a pair of shoes that are sold only in America.
The shoes cost $50 and the current exchange rate is $1 = R12.

3.2.1 How much will the shoes cost in rand? (1)

50×12✓ = R600✓

3.2.2 Tumi decides to only buy the shoes in 2 years' time, however, over that time period the following changes have taken place:

- Inflation has caused the price of the shoes to increase by 8% **per year**.

- The exchange rate has also dropped to R11 per dollar.

Determine how much the shoes will cost in 2 years' time in rand. (5)

$A = 50(1 + 0,08)^2$✓✓

$A = \$58,32$✓

$\$58,32 \times 11$✓ = R641,52✓

GRADE 10 Test 1					
Question	Knowledge	Routine	Complex	Problem Solve	
1,1		3			
1,2		2			
1,3		3			
1,4			3		
1,5				6	
2,1,1		2			
2,1,2	1				
2,1,3			6		
2,1,4	2				
2,2,1	1				
2,2,2	2				
2,3				3	
3,1,1		2			
3,1,2		2			
3,1,3		2			
3,1,4		2			
3,1,5	2				
3,2,1		1			
3,2,2			5		
Totals	8	19	14	9	50

RESOURCE 23

ASSESSMENT: TERM 3 TEST 2

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1	Trigonometry	23	
2	Euclidean Geometry	16	
3	Measurement	11	
	TOTAL	50	

QUESTION 1   **23 MARKS**

1.1 Using your calculator, evaluate the following:

    1.1.1 $\frac{1}{2}\sin 210^0$ (1)

    1.1.2 $\dfrac{\sin 20^0 \cos 10^0}{2\tan^4 20^0}$ (2)

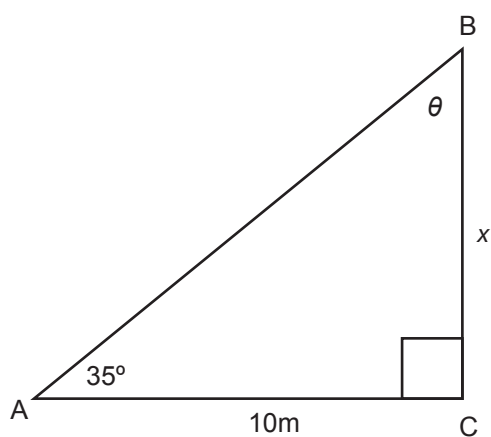1.2 Determine whether the following statements are True or False:

    1.2.1 $\cos(a + b) = \cos a + \cos b$ (1)
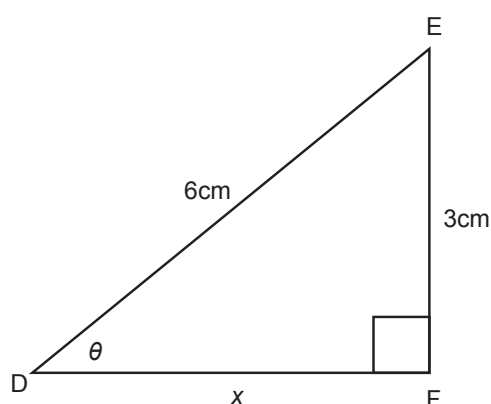
    1.2.2 $2\sin\theta = \sin 2\theta$ (1)

    1.2.3 $\tan^4 x = (\tan x)^4$ (1)
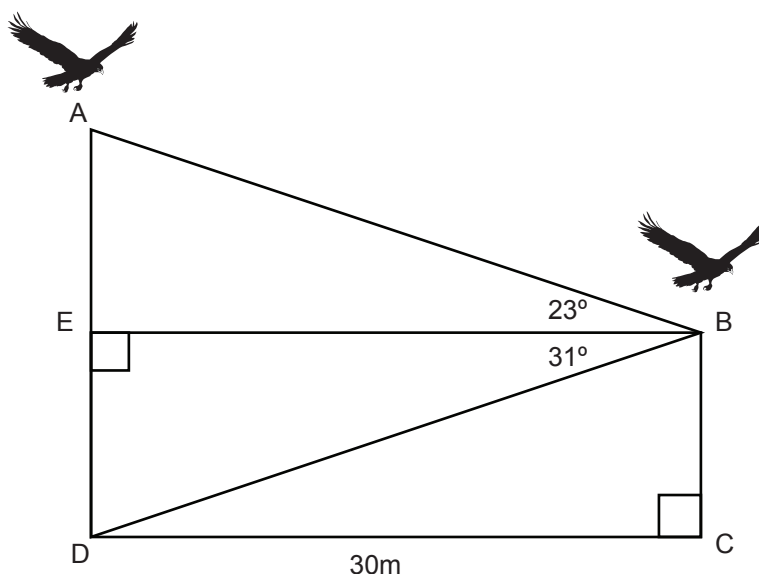
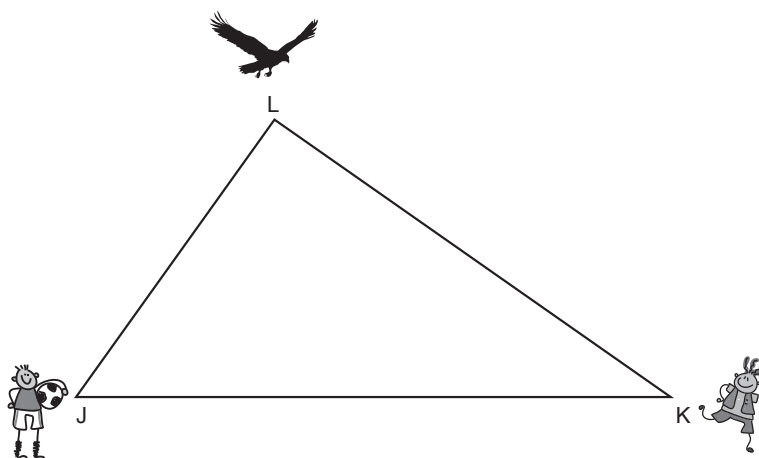1.3 Determine the value of *x* and *θ* the following triangles.

    1.3.1   B   (3)

    1.3.2   E   (4)

1.4 Two birds, A and B, are separated by a horizontal distance CD=30m. The angle of elevation from B to A is 23° and the angle of depression from B to D is 31°.

1.4.1 Determine the height, BC, of bird B. (2)

1.4.2 Determine the height of bird A. (3)

1.5 James is standing at point J and Kamo is standing at point K. They are standing in a flat, horizontal plane. They are both looking at a bird that is flying above them. The angle of elevation of the bird from where James is standing is 45° and the angle of elevation of the bird from where Kamo is standing is 35°. The distance, JL, between James and the bird is 25m, and the distance, KL, between Kamo and the bird is 33m. Determine how far away James and Kamo are standing from each other. (5)

QUESTION 2   **16 MARKS**
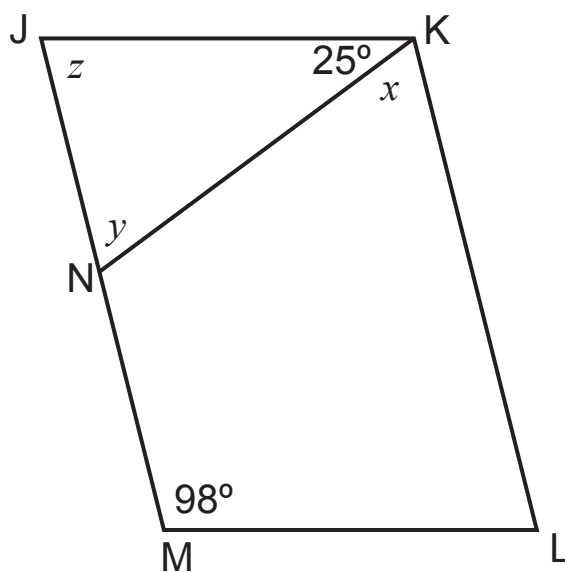
2.1 Write the shape that each statement below **most** accurately represents.

    2.1.1 Only one pair of opposite angles are congruent.   (1)

    2.1.2 Two pairs of opposite angles are congruent.   (1)

    2.1.3 Two pairs of opposite angles are congruent. There is also at least one
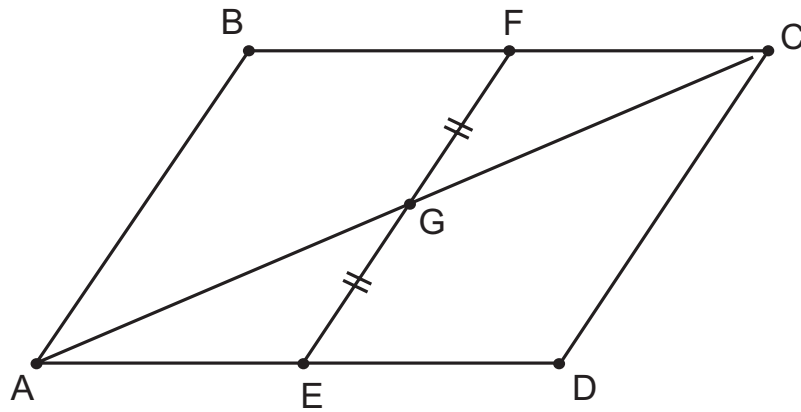 $90°$ angle.   (1)

2.2 In the diagram below: *JKLM* is a parallelogram.

    2.2.1 Determine the value of **ALL** the unknown variables   (6)

2.3 In the diagram below: *E* is the midpoint of line *AD*, *F* is the midpoint of line *BC*, and *G* is the midpoint of line *AC*. *EG=FG*.

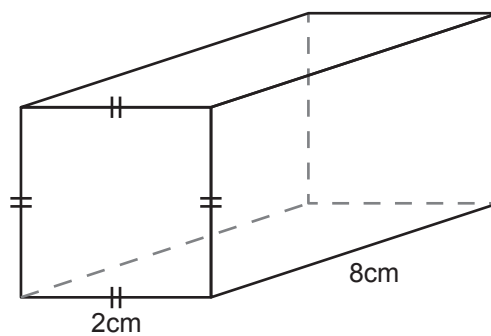2.3.1 Prove that *ABCD* is a parallelogram. (7)

QUESTION 3   11 MARKS
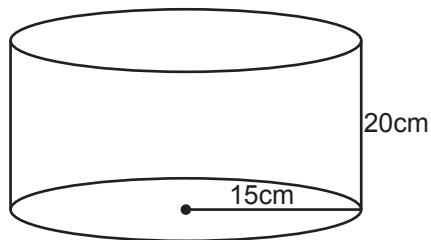
3.1 Consider the square prism below:

3.1.1 Determine the surface area of the square prism. (2)

3.1.2 Determine the volume of the square prism. (2)

3.2 Rethabile bakes a cake in a round tin with a radius of 15cm and a height of 20cm.

3.2.1 What is the volume of the cake if it fills the tin perfectly?
(Leave your answers in terms of π)   (2)

3.2.2 Rethabile decides to use a different tin to bake the cake. The new tin has a radius of 10cm, what should the height of the new tin be to bake a cake with the same volume?   (3)

3.2.3 If you doubled the height and radius, by what scale factor would you increase the volume?   (2)

RESOURCE 24

ASSESSMENT: TERM 3 TEST 2 MEMORANDUM

QUESTION	DESCRIPTION	MAXIMUM MARK	ACTUAL MARK
1	Trigonometry	23	
2	Euclidean Geometry	16	
3	Measurement	11	
	TOTAL	50	

QUESTION 1   **23 MARKS**

1.1 Using your calculator, evaluate the following:

     1.1.1 $\dfrac{1}{2}\sin 210^{0}$ (1R)

            $= -\dfrac{1}{4}\checkmark$

     1.1.2 $\dfrac{\sin 20^{0}\cos 10^{0}}{2\tan^{4}20^{0}}$ (2R)

            $= 9,6\checkmark\checkmark$

1.2 Determine whether the following statements are True or False:

     1.2.1 $\cos(a + b) = \cos a + \cos b$ __False__ $\checkmark$ (1K)

     1.2.2 $2\sin\theta = \sin 2\theta$ __False__ $\checkmark$ (1K)

     1.2.3 $\tan^{4}x = (\tan x)^{4}$ __True__ $\checkmark$ (1K)

1.3 Determine the value of x and θ the following triangles.

1.3.1 (3R)

$\theta + 35^0 + 90^0 = 180^0$

$\theta = 55^0$✓

$\tan 35^0 = \dfrac{x}{10}$✓

$x = 7m$✓

1.3.2 (4R)

$\sin\theta = \dfrac{3}{6}$✓
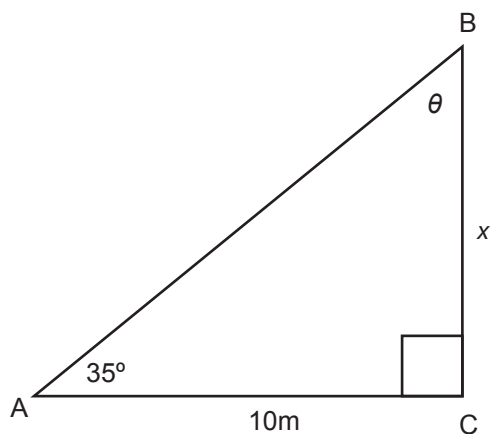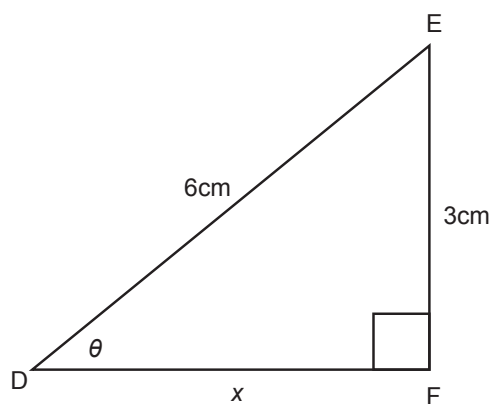
$\theta = 30^0$✓

$x^2 + 3^2 = 6^2$✓

$x^2 = 6^2 - 3^2$

$x^2 = 27$

$x = \sqrt{27}$ cm or $5,2$cm✓

1.4 Two birds, A and B, are separated by a horizontal distance *CD*=30m. The angle of elevation from *B* to *A* is 23° and the angle of depression from *B* to *D* is 31°.
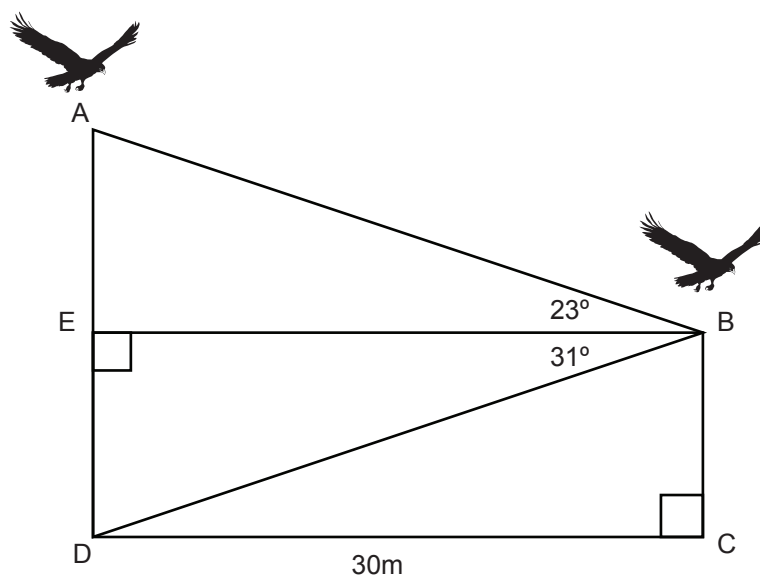
1.4.1 Determine the height, BC, of bird B.   (2C)

$\tan 31^0 = \dfrac{BC}{30}$ ✓

$BC = 18,03m$ ✓

1.4.2 Determine the height of bird A.   (3C)

$EB = 30m$

$\tan 23^0 = \dfrac{AE}{30}$ ✓

$AE = 12,73m$ ✓

$AD = AE + ED$

$AD = 12,72 + 18,03$ ✓

$AD = 30,75m$ ✓

1.5 James is standing at point J and Kamo is standing at point K. They are standing in a flat, horizontal plane. They are both looking at a bird that is flying above them. The angle of elevation of the bird from where James is standing is 45° and the angle of elevation of the bird from where Kamo is standing is 35°. The distance, JL, between James and the bird is 25m, and the distance, KL, between Kamo and the bird is 33m. Determine how far away James and Kamo are standing from each other. (5P)
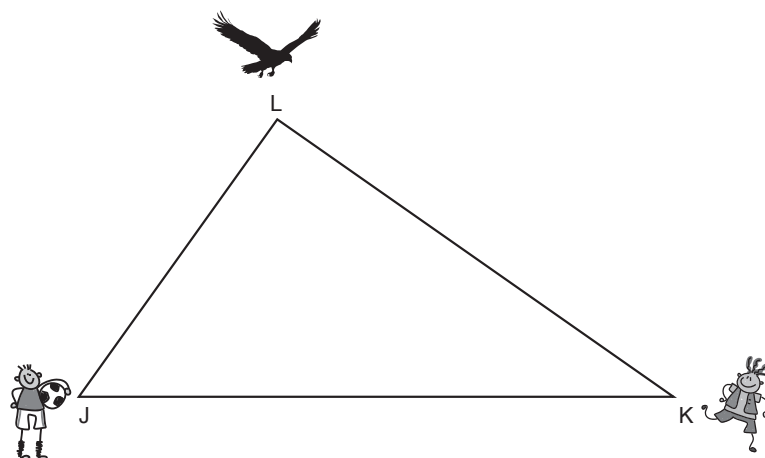
Let M be a point on line JK, vertically below L.

$$\cos 45º = \frac{JM}{25} \checkmark$$

$$JM = 17{,}68\text{m} \checkmark$$

$$\cos 35º = \frac{KM}{33} \checkmark$$

$$KM = 27{,}03\text{m} \checkmark$$

$$JK = 17{,}68 + 27{,}03 = 44{,}71\text{m} \checkmark$$

QUESTION 2   **16 MARKS**

2.1 Write the shape that each statement below **most** accurately represents.

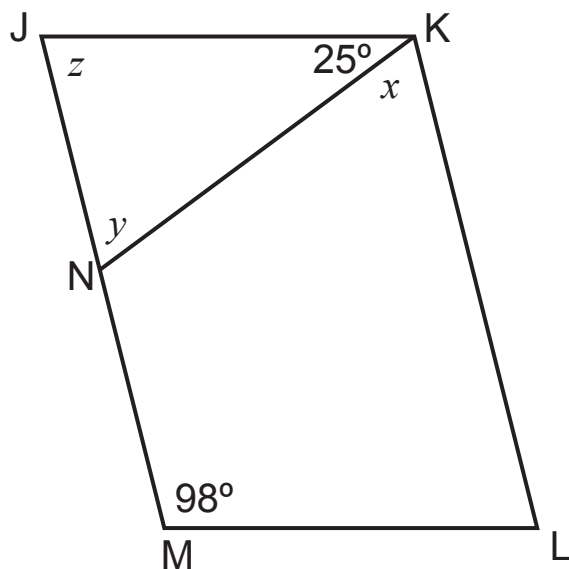2.1.1 Only one pair of opposite angles are congruent. (1K)
Kite $\checkmark$

2.1.2 Two pairs of opposite angles are congruent. (1K)
Parallelogram $\checkmark$

2.1.3 Two pairs of opposite angles are congruent. There is also at least one 90° angle. (1K)
Rectangle $\checkmark$

2.2 In the diagram below: *JKLM* is a parallelogram.

2.2.1 Determine the value of **ALL** the unknown variables   (3R+3C)

$$x + 25° = 98° \checkmark \qquad \text{(opp <'s of a parm)}$$

$$x = 73° \checkmark$$

$$y = 73° \checkmark \qquad \text{(alt <'s; } KL \parallel JM \text{)}$$

$$z + 73° + 25° = 180° \checkmark \qquad \text{(sum <'s in } \triangle\text{)}$$

$$z = 82° \checkmark$$

2.3 In the diagram below: *E* is the midpoint of line *AD*, *F* is the midpoint of line *BC*, and *G* is the midpoint of line *AC*. *EG=FG*.
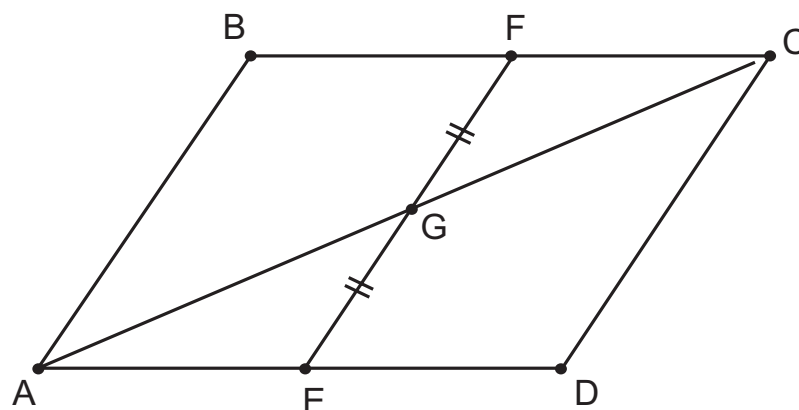
2.3.1 Prove that *ABCD* is a parallelogram. (7C)

$AB \parallel FG$✓ (midpt theorem)

$EG \parallel CD$✓ (midpt theorem)

$\therefore AB \parallel CD$✓

$FG = \frac{1}{2}AB$✓ (midpt theorem)

$EG = \frac{1}{2}CD$✓ (midpt theorem)

$EG = FG$ (given)

$\therefore AB = CD$✓

$\therefore ABCD$ is a parallelogram ✓ (one pair of opposite sides equal and parallel)

QUESTION 3   **11 MARKS**

3.1 Consider the square prism below:
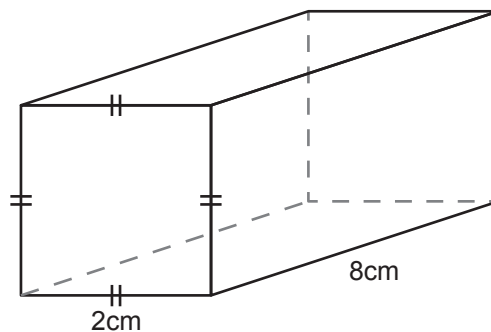
    3.1.1 Determine the surface area of the square prism.   (2R)

$$S.A. = 2(2 \times 2) + 4(2 \times 8) \checkmark$$
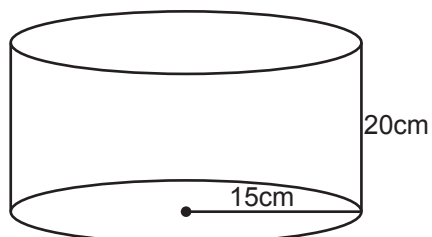
$$S.A. = 72\text{cm}^2 \checkmark$$

    3.1.2 Determine the volume of the square prism.   (2)

$$V = 2 \times 2 \times 8 \checkmark$$

$$V = 32\text{cm}^3 \checkmark$$

3.2 Rethabile bakes a cake in a round tin with a radius of 15cm and a height of 20cm.

    3.2.1 What is the volume of the cake if it fills the tin perfectly?
          (Leave your answers in terms of $\checkmark$)   (2R)

$$V = \pi r^2 h$$

$$V = \pi(15^2)(20) \checkmark$$

$$V = 4\,500\pi\text{cm}^3 \checkmark$$

3.2.2 Rethabile decides to use a different tin to bake the cake. The new tin has a radius of 10cm, what should the height of the new tin be to bake a cake with the same volume? (3C)

$V = \pi r^2 h$

$4\,500\pi = \pi(10^2)(x)$✓

$4\,500\pi = 100\pi x$✓

$x = 45cm$✓

3.2.3 If you doubled the height and radius, by what scale factor would you increase the volume? (2P)

Scale factor of 8 ✓ ✓

GRADE 10 Test 1					
Question	Knowledge	Routine	Complex	Problem Solve	
1,1,1		1			
1,1,2		2			
1,2,1	1				
1,2,2	1				
1,2,3	1				
1,3,1		3			
1,3,2		4			
1,4,1			2		
1,4,2			3		
1,5				5	
2,1,1	1				
2,1,2	1				
2,1,3	1				
2,2,1		3	3		
2,3,1			7		
3,1,1		2			
3,1,2		2			
3,2,1		2			
3,2,2			3		
3,2,3				2	
Totals	6	19	18	7	50