

ANNUAL NATIONAL ASSESSMENT EXEMPLAR 1

Question 1

Circle the letter of the correct answer:

1.1 If $4(x+3)(2x-1) = 0$, then $x =$

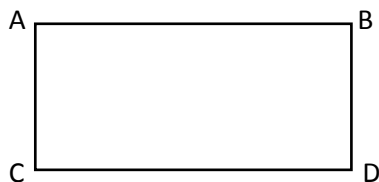
- A -3 or $\frac{1}{2}$
- B 4 or $\frac{1}{2}$
- C 0 or 3
- D 4 or -3

1.2 $\frac{x^4(x^2)^3}{(x^{-3})^{-2}} =$

- A x^3
- B x^4
- C x^8
- D x^{16}

1.3 In a rectangle ABCD, is $DC = 12 \text{ cm}$ and diagonal $BD = 15 \text{ cm}$

The length of BC in cm is:

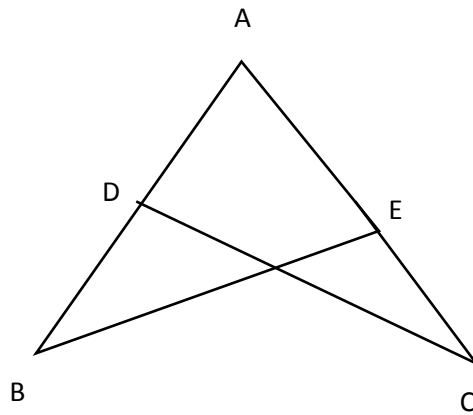


- A 3
- B 27
- C $\sqrt{369}$
- D 9

1.4 A circle has a diameter of 6 cm . The area of a quarter of the circle in cm^2 is:

- A 36π
- B 9π
- C $\frac{9}{4}\pi$
- D $\frac{9}{2}\pi$

1.5 In the figure is, $AB = AC$ and $AE = AD$. Give a reason why $\triangle ABE \equiv \triangle ACD$.



- A S S S
- B 90° hyp S
- C S < S
- D < < S

1.6 If $x = -2$ then the value of $-x^2 + 3x - 4 =$

- A -6
- B 6
- C -14
- D -8

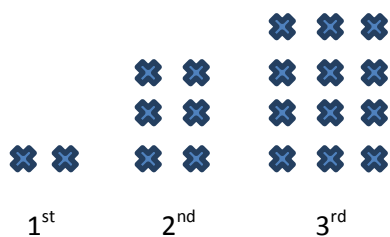
1.7 The 3-D figure with 5 faces, 5 vertices and 8 edges is a

- A cylinder
- B triangular prism
- C square-based pyramid
- D triangular-based pyramid

1.8 In scientific notation is $4 \times 10^{-12} \times 7 \times 10^{-7} =$

- A 28×10^{-20}
- B $2,8 \times 10^{-18}$
- C $2,8 \times 10^{-20}$
- D $0,28 \times 10^{-18}$

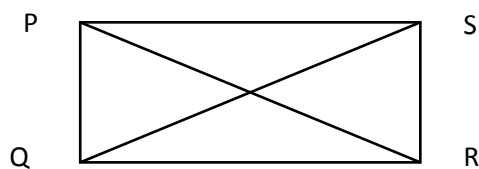
1.9 Study the following pattern



How many crosses will there be in the sixth cross- arrangement?

- A 56
- B 36
- C 42
- D 30

1.10 Which angle in rectangle PQRS is the angle of elevation of P from R?



- A $\angle R\hat{Q}R$
- B $\angle P\hat{Q}R$
- C $\angle P\hat{R}Q$
- D $\angle S\hat{P}R$

[10]

Question 2

2.1 Simplify:

2.1.1 $(x + 2)^2 - (x + 1)(x - 3)$ (3)

2.1.2 $\frac{6x^2 \times 8xy^3}{12x^4y^2}$ (3)

2.1.3 $\frac{-16x^3 - 8x^2 + 2x}{-2x} - (4x - 1)$ (5)

2.2 Multiply and then simplify:

2.2.1 $\frac{3}{4}(12a^2 - 8a - 4)$ (3)

2.2.2 $(a + 2)(a^2 - 2a + 4)$ (3)

2.3 Factorise fully:

2.3.1 $2x^2y^2 - 4x^2y + 10xy^2$ (2)

2.3.2 $9x^2 - y^2$ (2)

2.3.3 $2x^3 - 8x$ (3)

2.4 Use prime factors to determine the value of $\sqrt{1089}$ (4)

2.5 Solve for x :

2.5.1 $3(x - 1) - 4x = 5 - 2(x + 1)$ (3)

2.5.2 $\frac{2}{3}x - 1 = x$ (3)

2.5.3 $\frac{x - 2}{4} - \frac{x + 1}{3} = \frac{x - 2}{12}$ (5)
[39]

Question 3

3.1 Calculate the simple interest on R5 400 at 6% per annum for 4 years. (4)

3.2 Marcus borrows R8 000 from the bank at 5% compound interest per annum for 3 years. How much does he need to pay back to the bank after 3 years? (5)

3.3 The time it took different combinations of water pumps to empty a dam are tabulated below:

Number of pumps	21	10	5
Time in hours	2	4	8

3.3.1 Is this an example of a direct or an indirect proportion? (1)

3.3.2 Calculate the time that it would take 16 water pumps to pump the dam empty. (2)

3.4 If 4,5 kg sugar cost R36, what will 2,5 kg of sugar cost? (3)
[15]

Question 4

4.1 Write down the next two terms in the given sequence:
5; 9; 13; ...; ... (2)

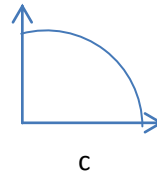
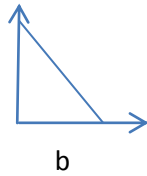
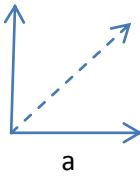
4.2 Describe the pattern in question 4.1 in your own words. (1)

4.3 Write down the general term of the given sequence in the form:
 $T_n = \underline{\hspace{2cm}}$ (2)

4.4 Which term in the sequence is equal to 38? (4)
[9]

Question 5

5.1 Use the graphs below to answer the following questions:



Which graph represents:

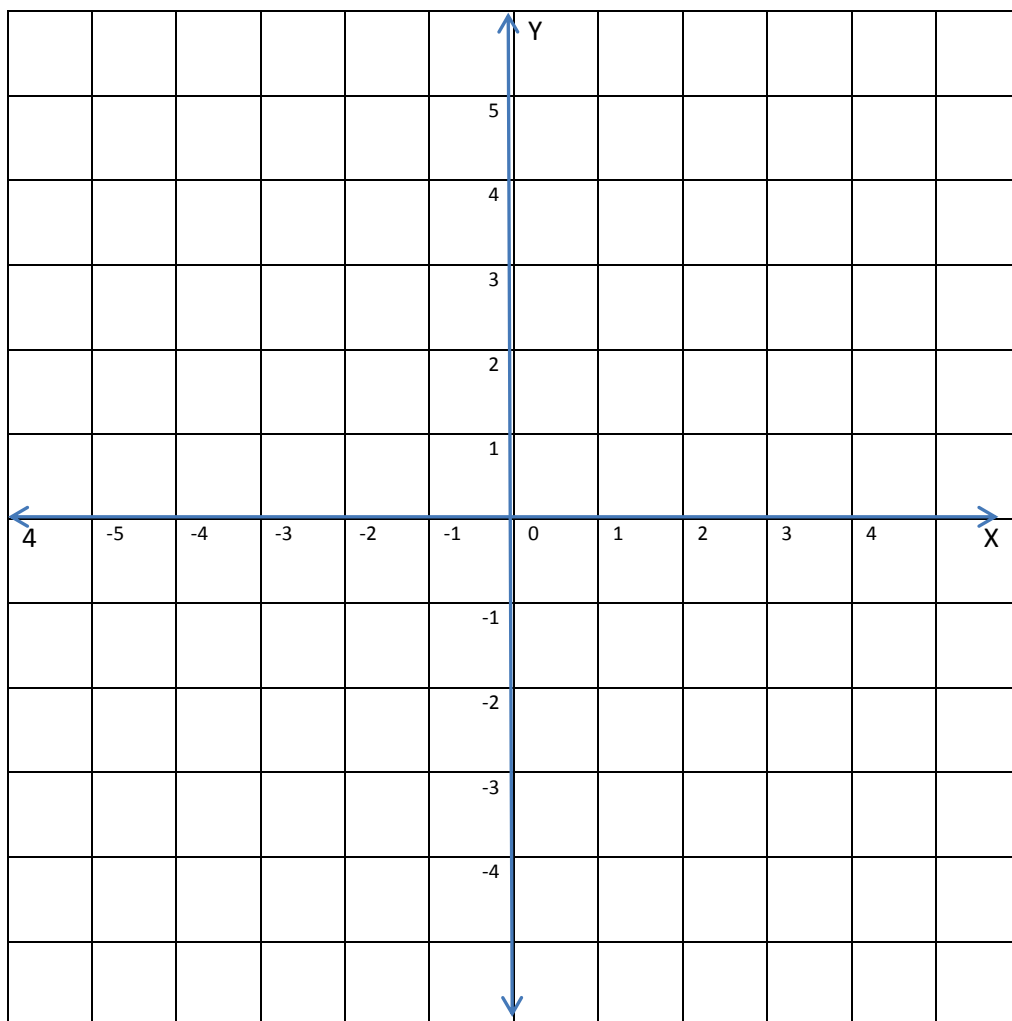
5.1.1 a decreasing, continuous and non-linear function? (1)

5.1.2 a broken line, increasing and linear function? (1)

5.2 On the same set of axes, draw and label the graphs defined by:

$$y = 2 - x, \text{ for } x \in \{-2; -1; 0; 1\} \text{ and}$$

$$y = 2x - 3, \text{ for } x \in R$$

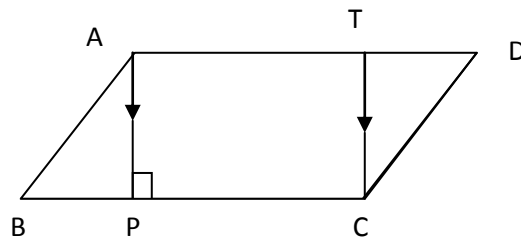


(7)
[9]

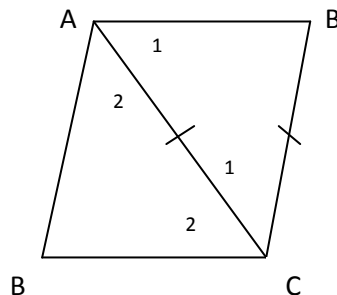
Question 6

Give reasons (proof) for every answer in QUESTION 6

- 6.1 In the diagram is $AD = BC$, $AB = CD$, $AP \perp BC$, $AP \parallel TC$, $AD = 24 \text{ cm}$, $BP = 8 \text{ cm}$ and $AP = 12 \text{ cm}$.

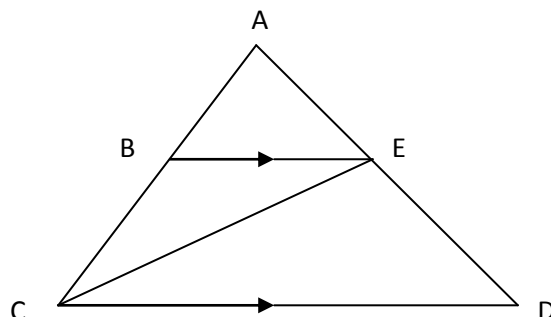


- 6.1.1 What type of quadrilateral is ABCD? (2)
- 6.1.2 Calculate the area of quadrilateral APCD (4)
- 6.1.3 Why is $AP = TC$? (1)
- 6.1.4 Prove $\triangle ABP \equiv \triangle CDT$ (4)
- 6.2 In the figure below is ABCD a parallelogram. $AC = BC$ and $\hat{C}_1 = 40^\circ$



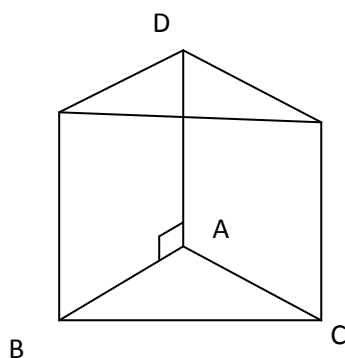
Calculate the size of $\hat{B} \hat{A} \hat{D}$ (9)

- 6.3



- 6.3.1 Which triangle is similar to $\triangle ACD$? (1)
- 6.3.2 Calculate the length of BC if $AE : AD = 3 : 8$ and $AB = 9 \text{ cm}$. (6)

- 6.4 The triangular prism below has a rectangular triangle as a base with $AB = 5\text{ m}$, $AC = 12\text{ m}$ and the height of the prism is 20 m .



- 6.4.1 Calculate the volume of the prism (3)
- 6.4.2 Calculate the surface area of the prism (8)
- [38]**

Question 7

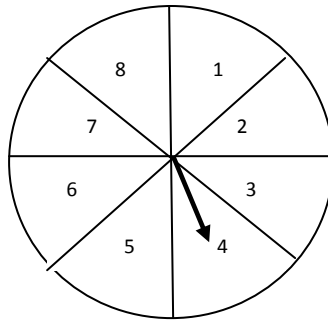
The Mathematics marks of a group grade 9 learners, with a total out of 100, is tabulated below:

38	52	68	81	72
31	45	55	74	49
52	47	64	58	84

- (4)
- 7.1 Draw a stem- and- leaf plot to illustrate the data.
- 7.2 Calculate the following using the given data:
- 7.2.1 The range (2)
- 7.2.2 The mode (1)
- 7.2.3 The median (2)
- 7.2.4 The mean (average) (3)
- 7.3 How many learners got more than 55% for the test? (2)
- [14]**

Question 8

The arrow on the turning wheel is able to turn freely. If the arrow is turned, what is the possibility that the arrow will stop at:



- | | | |
|-----|-------------------------|------------|
| 8.1 | a number bigger than 6? | (2) |
| 8.2 | a prime number? | (2) |
| 8.3 | a factor of 8? | (2) |
| | | [6] |

TOTAL: 140

ANNUAL NATIONAL ASSESSMENT EXEMPLAR 2

Question 1

Circle the letter of the correct answer:

1.1 Which of the following numbers is irrational?

A $0,\dot{8}$

B $0,5$

C $-\sqrt{3}$

D $\sqrt{2\frac{1}{4}}$

1.2 Which of the following numbers lie between 0,07 and 0,08 on a number line?

A $0,00075$

B $0,0075$

C $0,075$

D $0,75$

1.3 $\frac{2^{x-1} \cdot 4^{x+1}}{8^{x-1}} =$

A 3

B $x + 1$

C $0,25$

D 16

1.4 $\sqrt{16x^{16}} =$

A $4x^8$

B $4x^4$

C $8x^8$

D $8x^4$

1.5 $-(-3)^3 =$

A -9

B 27

C -27

D -6

1.6 $\left(\frac{x}{3} - 3y\right)\left(\frac{x}{3} + 3y\right) =$

- A $\frac{x^2}{9} + 3xy - 9y^2$
- B $\frac{x^2}{9} + xy - 9y^2$
- C $\frac{x^2}{9} + 9y^2$
- D $\frac{x^2}{9} - 9y^2$

1.7 Factorise $2p^2 + 2$

- A $2(p + 1)^2$
- B $2(p^2 + 1)$
- C $2(p + 1)(p - 1)$
- D $2p(p + 1)$

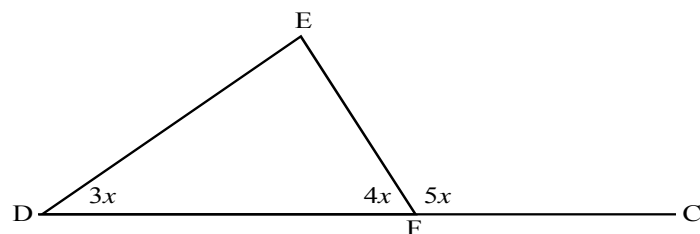
1.8 A painter is paid by the hour. If he is paid R360 for 12 hours work, how much will he be paid for 9 hours work?

- A R120
- B R180
- C R270
- D R480

1.9 Which number is missing in the sequence $1; \frac{1}{2}; \frac{1}{4}; \dots; \frac{1}{16}$?

- A $\frac{1}{8}$
- B $\frac{1}{10}$
- C $\frac{1}{12}$
- D $\frac{1}{14}$

1.10 In $\triangle EDF$, DF is produced to C. The size of \hat{E} is



- A 40°
- B 60°
- C 140°
- D 20°

Question 2

Answer the following questions:

2.1 Write 0, 00000356 *kl* in scientific notation. (2)

2.2 Calculate the value of $2x^3 - 3x^2 + 9x + 2$ if $x = -2$. (4)

2.3 Multiply $5a^2b^2 + 2ab - 3$ by $4ab$ (3)

2.4 Simplify:

2.4.1 $(a^2 b^3)^2 \cdot ab^2$ (2)

2.4.2 $\frac{x-y}{y+x} \times \frac{(x+y)^2}{x-y}$ (2)

2.4.3 $\frac{3a^{-2}b \times 24b^{-1}a^{-1}}{9a^{-4}b^{-3}}$ (3)

2.4.4 $\frac{x-2}{2x} - \frac{x-3}{3x}$ (5)

2.4.5 $\frac{4x^2}{2a^2} \div \frac{4x}{2a^2}$ (2)

2.4.6 $\frac{x^2 - 1}{3x + 3}$ (2)

2.5 Factorise fully

2.5.1 $3a^3 - 9a^2 - 6a$ (2)

2.5.2 $4(a + b) - x^2(a + b)$ (4)

2.6 Solve for x :

2.6.1 $8x + 3 = 3x - 22$ (2)

2.6.2 $x - \frac{x-1}{2} = 3$ (3)

2.6.3 $3^{x+1} = 81$ (3)

[40]

Question 3

Answer the following questions

- 3.1 Write the ratio $1\frac{2}{3} : 2\frac{2}{3}$ in the simplest form. (2)
- 3.2 6 boys each contribute R155,50 towards the purchase of a tent. Calculate how much each would contribute if there were 10 boys in the group. (3)
- 3.3 How long will it take for an investment of R3000 at 8% per annum simple interest to earn R960 interest? (3)
- 3.4 Calculate what R10000 will amount to if it is invested at 10 % per annum compound interest for 3 years. (3)

[11]

Question 4

Answer the following questions.

Matchsticks are arranged as shown in the following figures

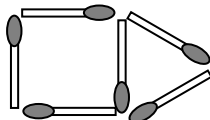


Figure 1

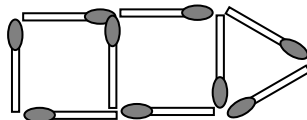


Figure 2

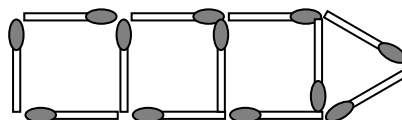


Figure 3

- 4.1 Determine the number of matchsticks in the next figure if the pattern is continued (2)
- 4.2 Write down the general term of the given sequence of the matchsticks in the form: (2)
- $T_n = \underline{\hspace{4cm}}$
- 4.3 Determine the number of matchsticks in the 20th figure. (2)

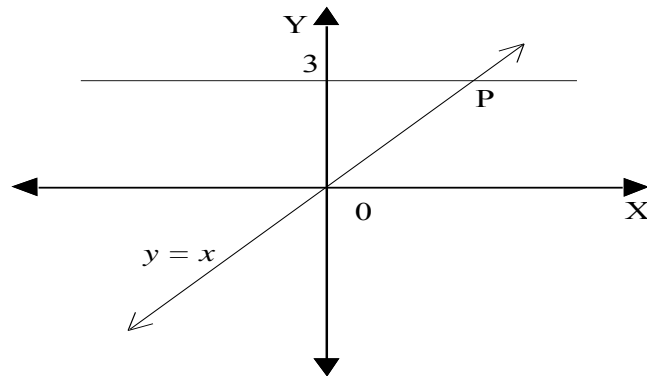
[6]

Question 5

Answer the following questions

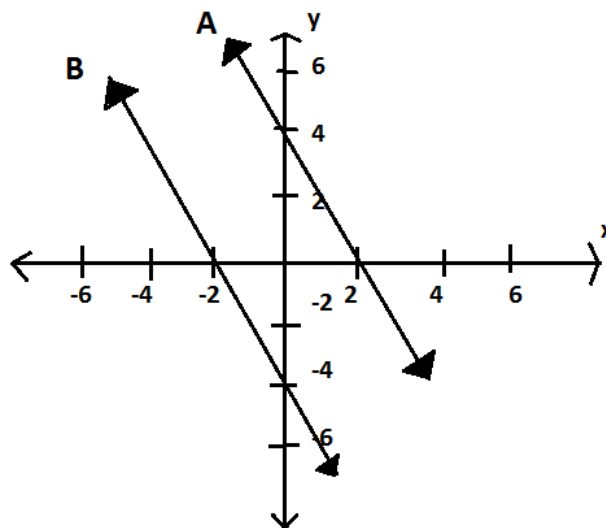
5.1 Determine the co-ordinates of P in the graph below

(1)



5.2 Write down the defining equation of each of the following straight line graphs.

(4)



5.3 What can you deduce about lines AD and BC?

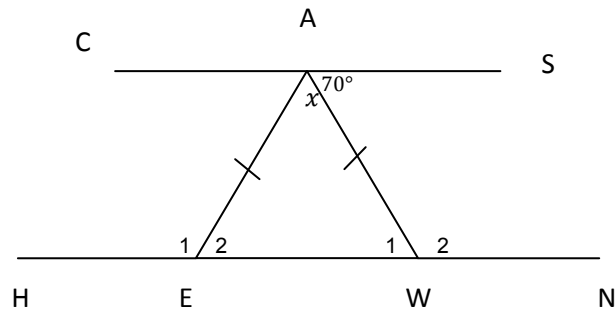
(2)

Give a reason for your answer.

[7]

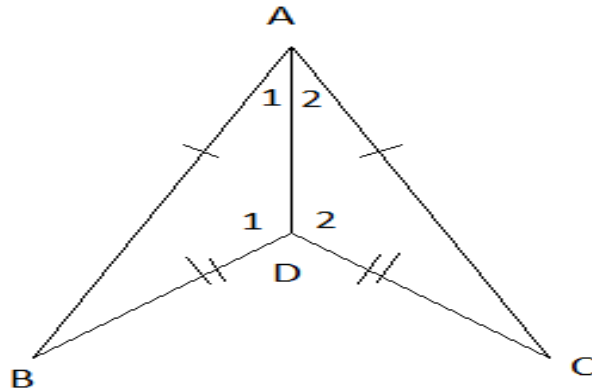
Question 6

6.1 Answer the following questions:



6.1 In the above figure, $CS \parallel HN$, $\angle EAW = 70^\circ$, $AE = AW$ and $\angle CAE = x$. Determine the value of x (3)

6.2

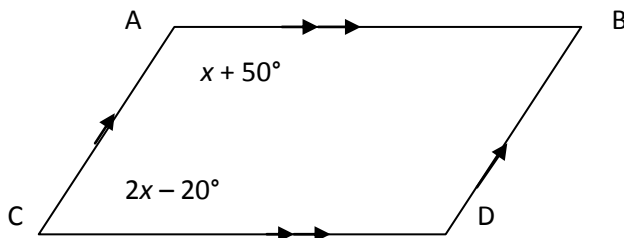


In the above figure, $AB = AC$ and $BD = CD$

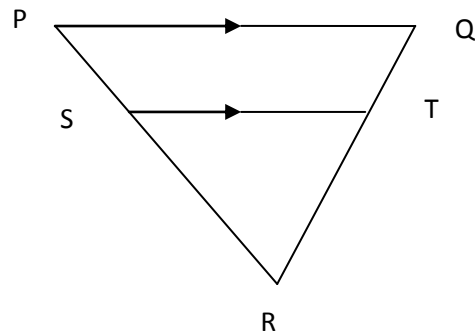
6.2.1 Prove that $\triangle ABD \equiv \triangle ADC$ (4)

6.2.2 Prove that DA bisects $\angle BAC$. (2)

6.3 ABCD is a parallelogram. Calculate the size of \hat{B} . (4)



6.4 In $\triangle PQR$, $PQ \parallel ST$, $PR = 10 \text{ cm}$, $ST = 3 \text{ cm}$ and $SR = 6 \text{ cm}$



6.4.1 Show that $\Delta PQR \parallel \Delta STR$ (4)

6.4.2 Calculate length of PQ. (3)
[21]

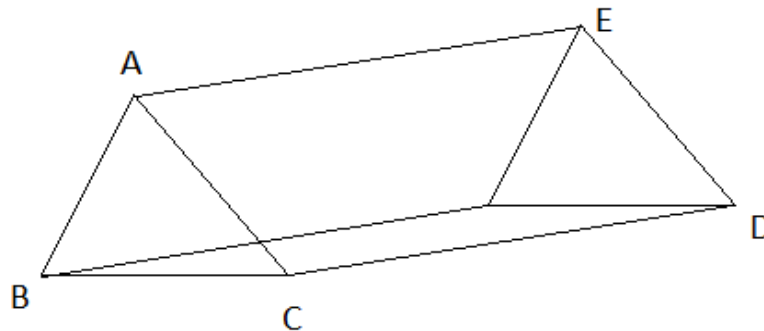
Question 7

Answer the following questions:

7.1 A ladder is standing against the wall. If the ladder reaches a height of $12m$ up the wall and has its foot $5m$ away from it, calculate the length of the ladder. (3)

7.2 What is the height, correct to the nearest cm , of a 5 litre cylindrical oil container with a radius of $20cm$? ($1\text{ litre} \approx 1000\text{ cm}^3$) (3)

7.3

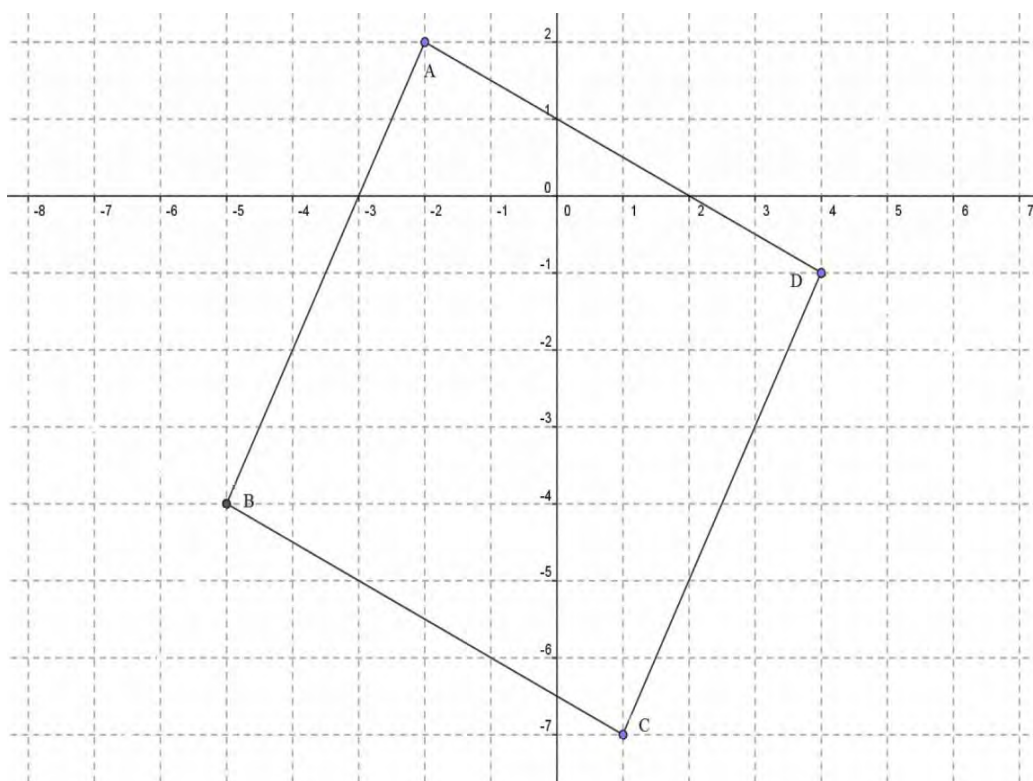


In the above triangular prism, $AB = 3\text{ cm}$, $AC = 4\text{ cm}$, $BC = 5\text{ cm}$ and $CD = 12\text{ cm}$.

7.3.1 Show that ΔABC is a right-angled triangle (4)

7.3.2 Hence, calculate the surface area of the prism (4)
[14]

Question 8



- 8.1 Use the sketch given above and write down the co-ordinates of A, B, C and D. (4)
- 8.2 If the figure is shifted 2 units vertically down and 2 units horizontally to the right, write down the co-ordinates of A', B', C', and D'. (4)
- 8.3 Write down the co-ordinates of C'', the image of C, if the figure is reflected in the X-axis (2)
- 8.4 Write down the co-ordinates of B'', the image of B, if the figure is reflected in the Y-axis. (2)

[12]

Question 9

- 9.1 The data set contains the heights of a class of grade 9 learners.

140	149	152	159	153	143	161	152	145	162
153	158	154	160	164	165	165	155	167	153
148	166	144	160	150	155	141	162	161	151
159	163	170	153	172	158	174	166	164	163

Complete the table:

(14)

Class-interval	Tally marks	Frequency
$140 < x \leq 144$		
$145 < x \leq 149$		
$150 < x \leq 154$		
$155 < x \leq 159$		
$160 < x \leq 164$		
$165 < x \leq 169$		
$170 < x \leq 174$		

9.2 Determine:

9.2.1 the range of the heights. (2)

9.2.2 the modal class-interval. (2)

9.2.3 in which class-interval the median lies. (2)

[20]

TOTAL: 140

ANNUAL NATIONAL ASSESSMENT EXEMPLAR 3

Question 1

Circle the letter of the correct answer:

- 1.1 If the fractions are arranged from lowest to highest then the middle fraction is:

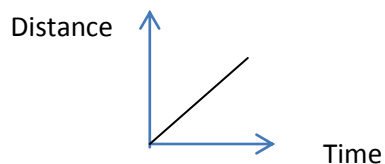
$$\frac{1}{3}; 31\%; \frac{3}{10}; 0,313; 0,303$$

- A $\frac{1}{3}$
- B 0,313
- C $\frac{3}{10}$
- D 31%
- E 0,303

- 1.2 There are 3 blue pencils, 5 green pencils, 2 black pencils, and 6 red pencils in a drawer. Suppose you grab one pencil at random. What will the probability be that you will grab a blue or a red pencil?

- A $\frac{3}{8}$
- B $\frac{9}{16}$
- C $\frac{3}{16}$
- D $\frac{1}{2}$
- E $\frac{2}{3}$

- 1.3 The graph below represents the motion of a car. The graph shows us that the car is:



- A accelerating
- B standing still
- C travelling north-east
- D travelling uphill
- E travelling at a constant speed

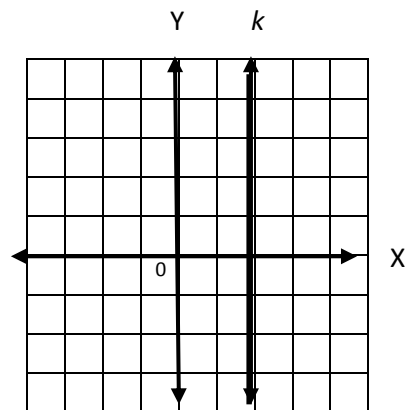
1.4 The value of $\sqrt{\frac{1600}{0,1 \times 0,1}}$ is:

- A 0,4
- B 4
- C 40
- D 400
- E 4000

1.5 The next number in the pattern of 9; 10; 13; 18; is:

- A 21
- B 23
- C 25
- D 29
- E 19

1.6 The equation of line k is:



- A $x = 2$
- B $x = -2$
- C $y = 2$
- D $y = -2$
- E $y = x$

1.7 $\triangle ABC$ is a right triangle with $AB = 26 \text{ cm}$ and $BC = 15 \text{ cm}$. The length of the hypotenuse is:

- A 21 *cm*
- B 26 *cm*
- C 30 *cm*
- D 52 *cm*
- E 41 *cm*

1.8 A scale model for a car is 8 *cm* long. If 2 *cm* represents 3 meters, what is the actual length of the car?

- A 6 *m*
- B 8 *m*
- C 12 *m*
- D 18 *m*
- E 16 *m*

1.9 The high temperatures for the last 5 days in January were 31°C, 32°C, 29°C, 26°C and 32°C. The median of these temperatures are:

- A 30°C
- B 32°C
- C 31°C
- D 26°C
- E 31,5°C

1.10 A closed six-sided figure is called:

- A Rectangle
- B Hexagon
- C Octagon
- D Pentagon
- E Parallelogram

[10]

Question 2

2.1 Calculate and give the answer in scientific notation: (2)
 $(5,7 \times 10^{-4}) \times (3 \times 10^{-1})$

2.2 Simplify:

2.2.1 $\left(\frac{5^2 \cdot 7^3}{5^3 \cdot 7^2} \right)^{-1}$ (2)

2.2.2 $\frac{(-3xy)^2(-2x^2y)}{18x^{-1}y}$ (2)

[6]

Question 3

3.1 Subtract $3(x - 3x^2 - x^3)$ from $2x^3 - 7x + 1$ (3)

3.2 Simplify

3.2.1 $(3x - 1)(x + 2)$ (2)

3.2.2 $(2x + 3y)(2x - 3y) - (2x + y)^2$ (4)

3.3 Factorise fully:

3.3.1 $\frac{1}{2}x^2 - 8$ (3)

3.3.2 $12(x - 4) - y(4 - x)$ (2)

3.4 If $a = -1$ and $b = -\frac{1}{2}$ and $c = 4$, evaluate $a^2 - b^2 + c^2$ (3)

3.5 Simplify: $\frac{7x-5}{2} - \frac{10x-7}{3}$ (4)

[21]

Question 4

Solve for x :

4.1 $2(x - 3) = x - 3(x + 2)$ (3)

4.2 $\frac{x-2}{4} - \frac{x+1}{3} = \frac{x-2}{12}$ (4)

4.3 $5^x = 625$ (2)

4.4 $2(x + 2) < 3(3x - 4)$ (4)

[13]

Question 5

5.1 Dumisani earns R42 480 per month. He splits his earnings in the ratio 7: 5 and then saves the lesser amount. How much does he save? (2)

5.2 A flight from Johannesburg to Durban takes one hour. If an aeroplane flies at 600 km/h. At what speed will it fly if the same flight takes $1\frac{3}{4}$ hours? (2)

5.3 Peter used 5 l of paint to paint a wall that is 8 m long and 5 m high. How many square metres (m²) can Peter paint with 1 l of paint? (3)

5.4 Sipho has R5 000 to invest for 10 years. His bank offers him 6,5% p.a. on compound interest. His uncle offers him 7,5% on simple interest. Which of the investments is the best option for an investment of 10 years? (7)

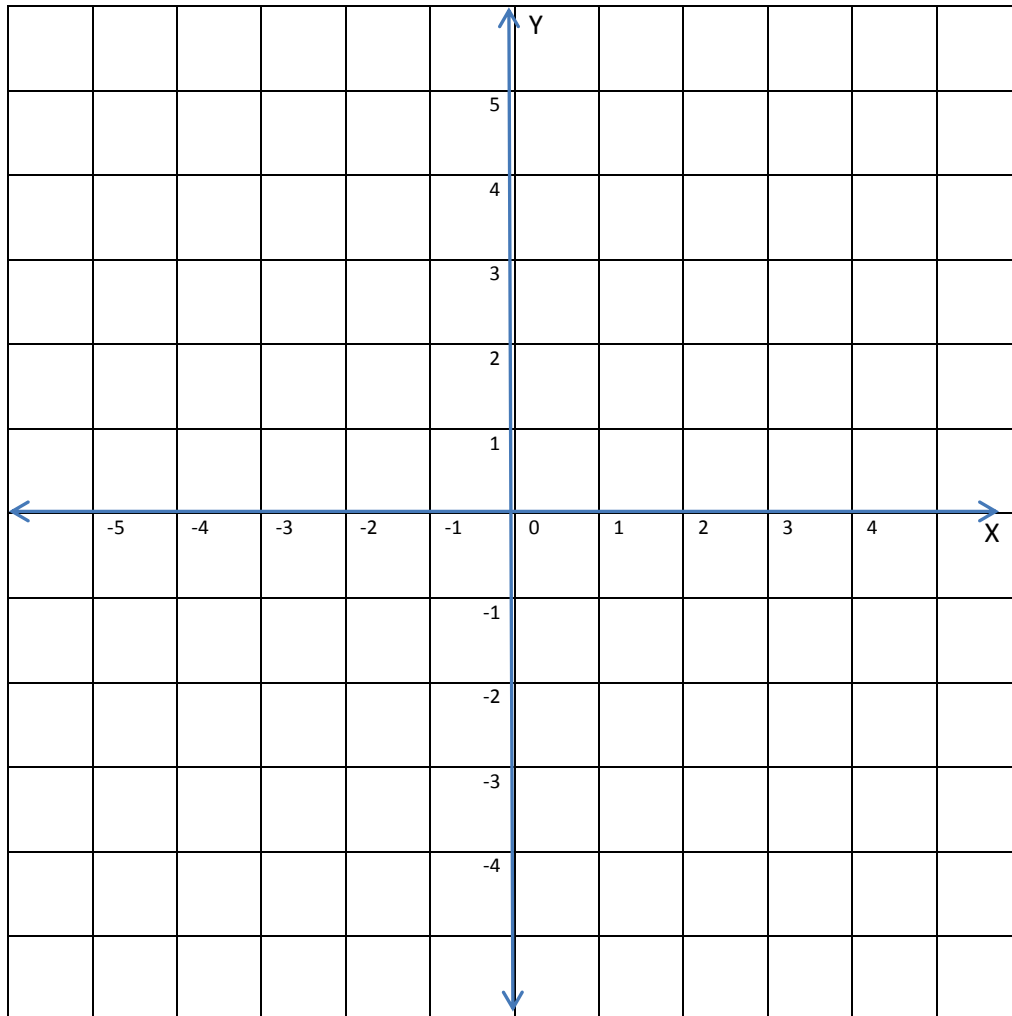
5.5 Mary-Anne bought a pair of shoes for R450. Her niece in Zambia wants to know what the shoes cost in Zambian dollars. If the Rand: Zambian dollars are 1: 650 in ratio, what is the cost of the shoes in Zambian dollars? (2)

[16]

Question 6

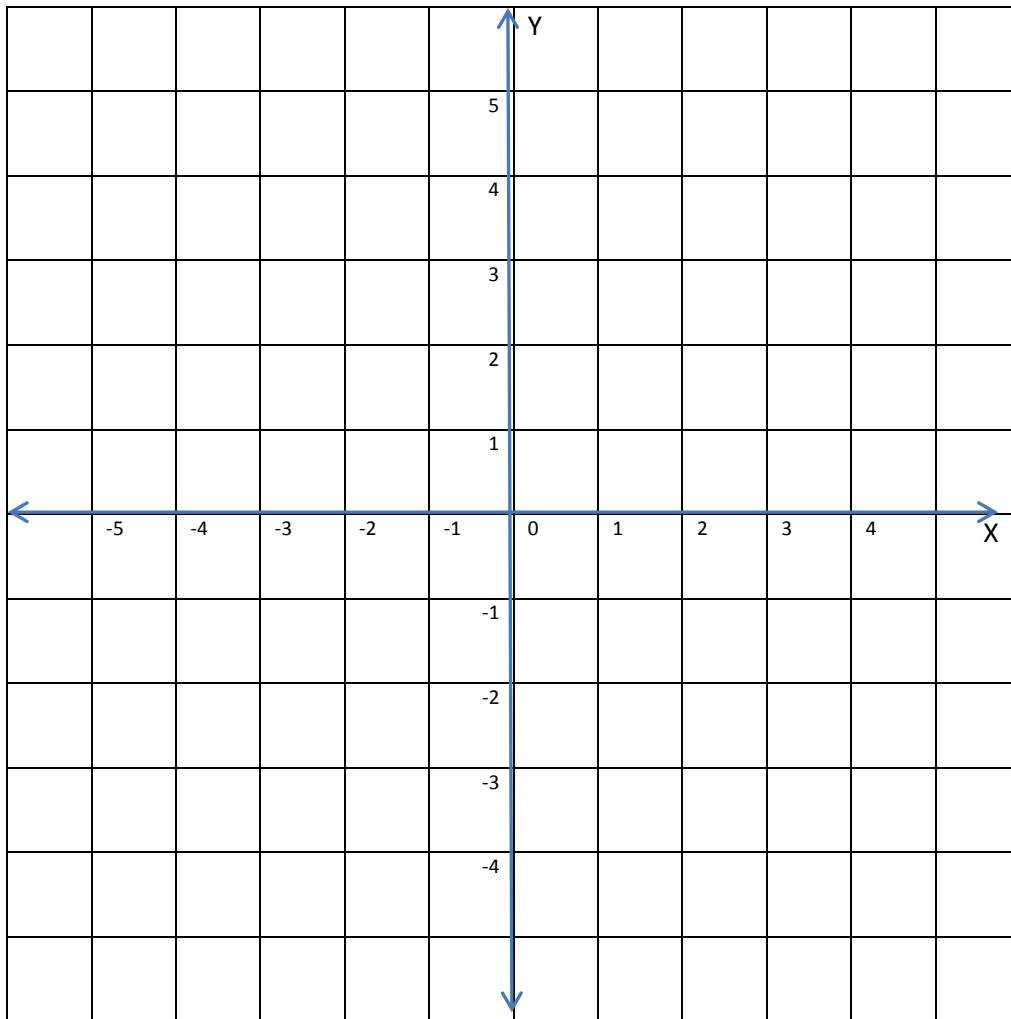
6.1 Rewrite $3y - x + 5 = 0$ in the form $y = ax + q$ ($y = mx + c$) and determine q (2)

6.2 On the same set of axes, draw and label the graphs defined by $y = -2$ and $x = 3$ (2)



6.2.1 Underline the word between brackets so that the statement is correct: (1)
the lines $y = -2$ and $x = 3$ are (parallel / perpendicular) to one another.

- 6.3 Draw the graph $y - 3x + 4 = 0$ for $x \in \{-2; -1; 0; 1\}$ on the grid provided (4)



[9]

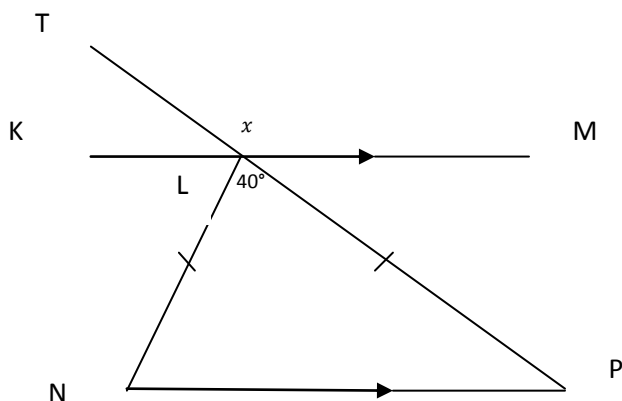
Question 9

- 9.1 Write down the following two terms of the row: 5; 7; 9; 11; ... (2)
- 9.2 Describe the pattern in 9.1 in your own words. (1)
- 9.3 Write down the general term of the given sequence in the form (2)
- $T_n = \dots\dots\dots$
- 9.4 Determine the tenth term. (2)
- 9.5 Which term in the sequence is equal to 81? (3)

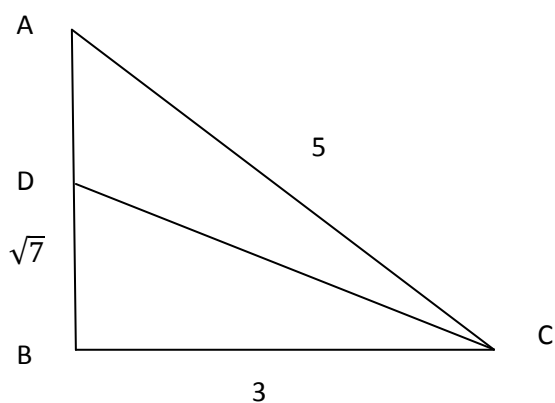
[10]

Question 10

- 10.1 In the figure below, $KM \parallel NP$, $LN = LP$ and $\angle NLP = 40^\circ$. Determine with reasons the size of $\angle TLM$ (4)



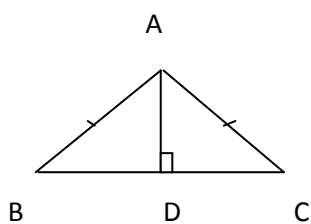
- 10.2 (5)



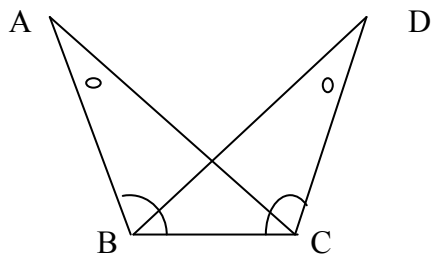
In the above figure $\angle B = 90^\circ$, $AC = 5$ units, $BC = 3$ units and $BD = \sqrt{7}$ units. Calculate the lengths of AD and DC . Leave the answer in surd form if necessary.

- 10.3 Are the following figures congruent? Give a reason for your answer.

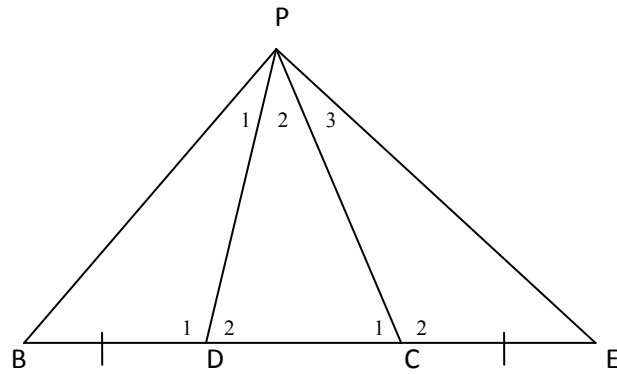
- 10.3.1 (1)



- 10.3.1 (1)



- 10.4 In the figure below is $BD = CE$ and $\angle D_2 = \angle C_1$

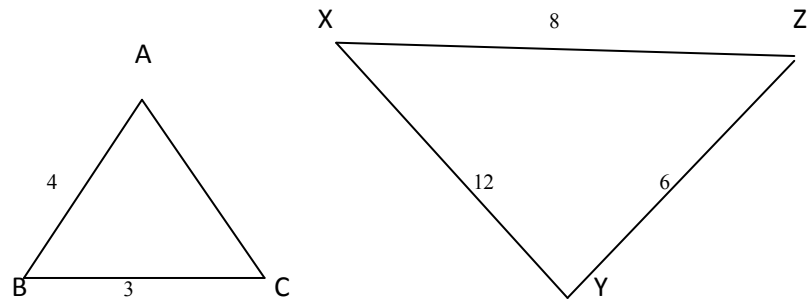


10.4.1 Proof $\widehat{D}_1 = \widehat{C}_1$ with reasons (2)

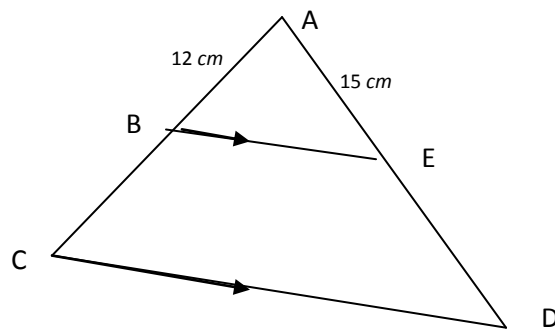
10.4.2 Proof $\triangle PBD \equiv \triangle PEC$ with reasons (4)

10.4.3 Classify $\triangle PBE$ according to sides (1)

10.5 Are the following figures similar? Give a reason for your answer. (1)



10.6 In $\triangle ACD$, $BE \parallel CD$, $AB = 12 \text{ cm}$, $AE = 15 \text{ cm}$ and $BE : CD = 1 : 3$

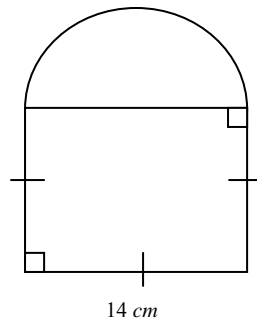


10.6.1 Proof $\triangle ABE \sim \triangle ACD$ with reasons (3)

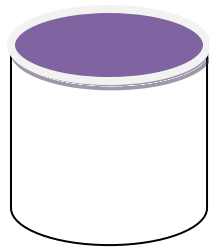
10.6.2 Calculate the lengths of AC and AD (2)
[24]

Question 11

- 11.1 Calculate the area of the following figure: (4)



- 11.2 The radius of a can in the form of a cylinder is 7 cm and its height is 12 cm .



- 11.2.1 Calculate the volume of the can (2)

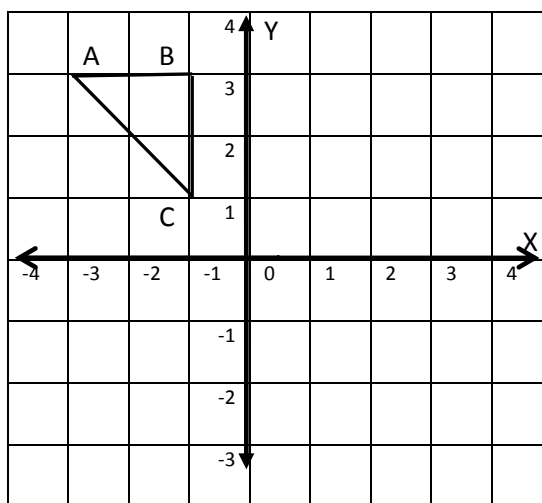
- 11.2.2 The can is open on top. Calculate how much material I will need in m^2 if I want to cover the side of the can? (3)

[9]

Question 12

- 12.1 $A(-2;3)$, $B(1;5)$ and $C(5;-2)$ are vertices of $\triangle ABC$. The sides of $\triangle ABC$ are enlarged by scale factor 3. Write down the co-ordinates of the vertices of the enlarged triangle. (3)

12.2



- 12.2.1 Translate $\triangle ABC$ 2 units to the right and 1 unit downwards. Use the letter C to label the new triangle and give the co-ordinates of the (4)

vertices of the translated triangle.

[7]

Question 13

The Maths marks out of 20 of a Grade 9 class is as follows:

10 9 12 7 12 10 15 11 17 19 11 15 18 12 13
20 11 12 16 14 13 19 10 16 14 16 8 12 9 14

13.1 Complete the frequency table of the given information: (4)

INTERVAL	FREQUENCY
$0 < x \leq 5$	
$6 < x \leq 10$	
$11 < x \leq 15$	
$16 < x \leq 20$	

13.2 Draw a histogram of the information (6)

13.3 Determine the:

13.3.1 mean (1)

13.3.2 mode (1)

13.3.3 median (1)

13.3.4 range (1)

13.4 How many learners have achieved above the average? (1)

[15]

TOTAL: 140

Question 1

Circle the letter of the correct answer:

1.1 The number $\frac{1}{3} \times \frac{1}{2} \div \frac{1}{3}$ is equal to:

- A $\frac{1}{2}$
- B 1
- C 2
- D $\frac{1}{4}$
- E $\frac{3}{4}$

1.2 If the numbers $\sqrt[3]{9}$; $\sqrt{5}$; 1; 2; 3 are arranged in order of magnitude, then the middle number is:

- A $\sqrt[3]{9}$
- B $\sqrt{5}$
- C 1
- D 2
- E 3

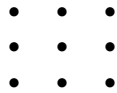
1.3 On earth there are about 10 000 000 000 000 000 ants and 6 000 000 000 humans. The ratio of humans to ants is approximately equal to:

- A 60 000 to 1
- B 1 666 667 to 1
- C 1 to 6 000
- D 1 to 1 666 667
- E 1 to 60 000 000

1.4 The number 36 is 12% of:

- A 250
- B 300
- C 350
- D 400
- E 450

1.5 Nine points lie in a plane, as shown above. If any three points are joined to form a triangle, then the numbers of all possible triangles that can be drawn are:



- A 22
- B 24
- C 26
- D 32
- E 34

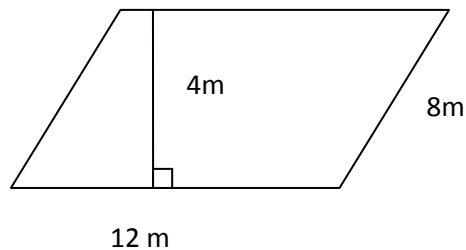
1.6 If $3(x-1)(x+2) = 0$, then x is:

- A -1 or 2
- B 1 or -2
- C 3; 1 or -2
- D 1
- E -2

1.7 The 20th term of the sequence 5; 11; 17; ... is:

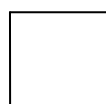
- A 100
- B 119
- C 121
- D 139
- E 141

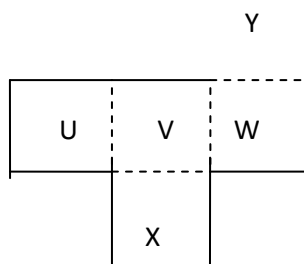
1.8 The area of the parallelogram is:



- A $38 m^2$
- B $42 m^2$
- C $48 m^2$
- D $54 m^2$
- E $32 m^2$

1.9 A piece of paper is cut out and labelled as shown in the diagram. It is folded along the dotted lines to make an open box. If the box is placed on a table so that the top of the box is open, then the label at the bottom of the box is:





- A U
- B V
- C W
- D X
- E Y

- 1.10 A survey was conducted in the nine grade class at Nokulunga High School. 45 students stated that they had a computer at home with e-mail access. 180 students were surveyed. In a group of 800 nine graders, which is the best prediction of how many have e-mail access?

- A 200
- B 180
- C 120
- D 110
- E 100

[10]

Question 2

- 2.1 Simplify and leave your answer with positive exponents:

2.1.1 $(-2x)^3 \times 2x^0$ (2)

2.1.2 $\frac{a^4 b^3 \times a^3 b^{-6}}{a^2 b}$ (3)

- 2.2 Multiply and then simplify your answer

2.2.1 $(2x - y)^2$ (2)

2.2.2 $4\left(x + \frac{1}{4}\right)\left(x - \frac{1}{4}\right) - \left(x^2 - \frac{1}{4}\right) - 3x$ (4)

[11]

Question 3

- 3.1 Factorise fully:

3.1.1 $6x^3y^5 + 3x^6y - 12xy^6$ (2)

$$3.1.2 \quad a^3 - ab^2 \quad (2)$$

$$3.1.3 \quad t^2(x - y) + z^2(y - x) \quad (3)$$

3.2 Simplify:

$$3.2.1 \quad \frac{a-4}{2a-8} \times \frac{2(a+4)}{a^2-16} \quad (3)$$

$$3.2.2 \quad \frac{7x-5}{2} - \frac{10x-7}{3} \quad (4)$$

[14]

Question 4

Solve for x :

$$4.1 \quad 13 - 2x = 9(x - 1) \quad (3)$$

$$4.2 \quad \frac{5x}{2} - \frac{15}{2} = \frac{4x}{3} + \frac{5(x+2)}{6} \quad (5)$$

$$4.3 \quad 3x + 15 \leq 5x + 1 \quad (2)$$

[10]

Question 5

Given: -4; -7; -10; ...

5.1 Write down the next TWO terms if the pattern behaves consistently. (2)

5.2 Describe the pattern in question 5.1 in your own words. (1)

5.3 Determine the rule (formula) for the general term in the form:
 $T_n = \dots\dots\dots$ (2)

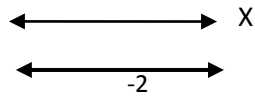
5.4 Calculate the 20th term. (2)

[7]

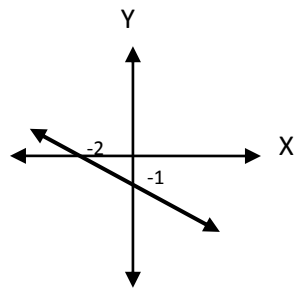
Question 6

6.1 Determine the equations of the graphs below:





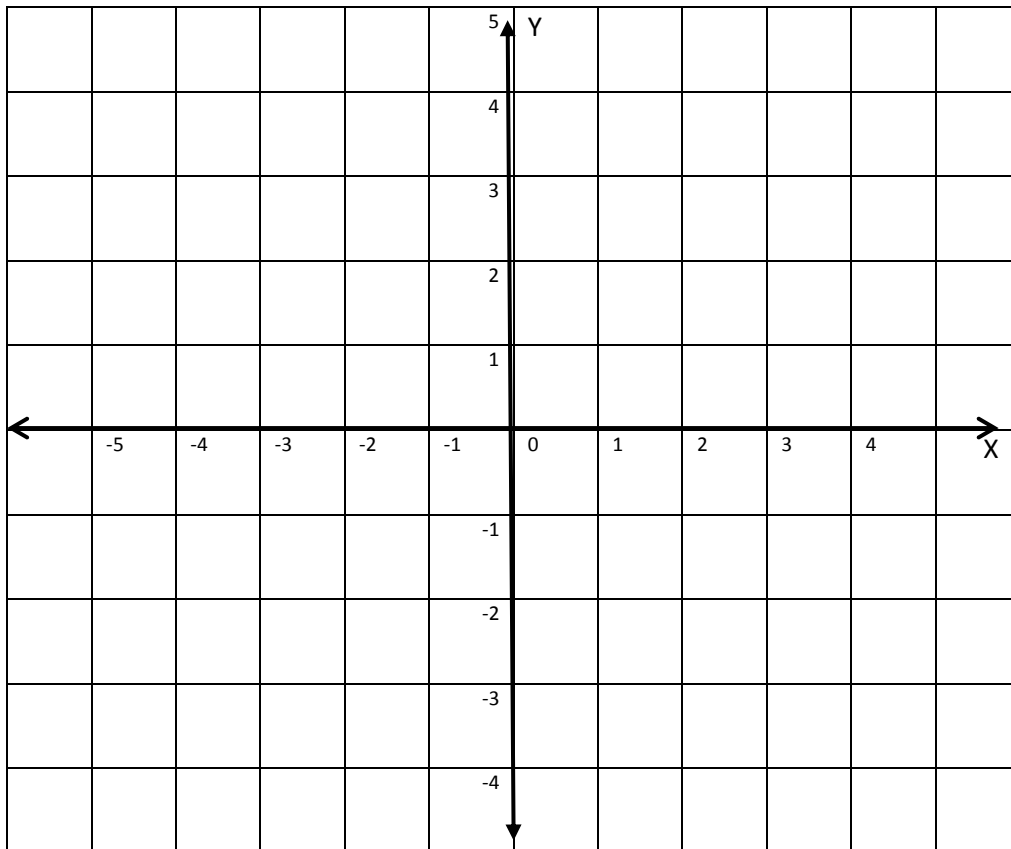
6.1.2



(3)

6.2 Draw the graph of $y = -2x - 3$ on the grid provided for $x \in \mathbb{R}$

(6)



6.3 We know that two parallel lines have the same gradient. Determine the equation of a line which is parallel to $y = -2x - 3$ and which passes through the point $(0;5)$ (2)

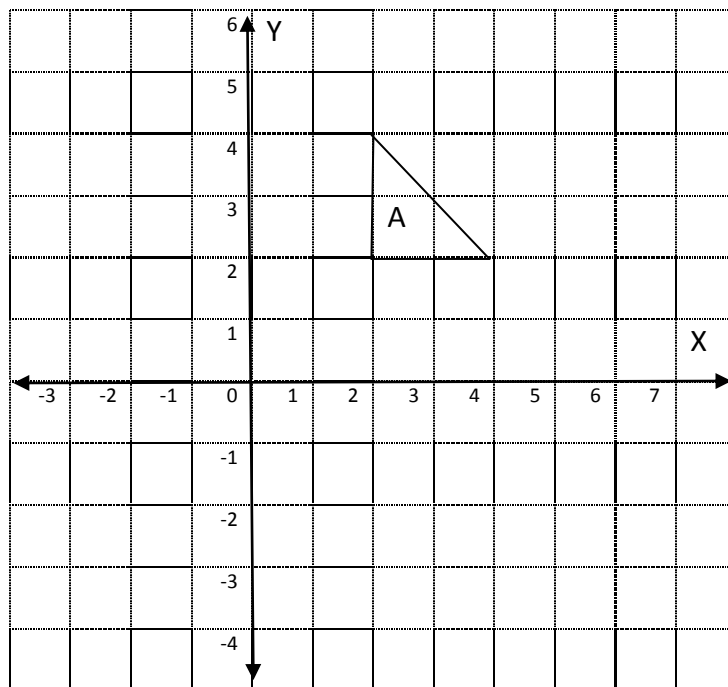
6.4 When two lines are perpendicular the product of their gradients is -1 . Determine the gradient of a line perpendicular to the line $3x + 4y = 10$ (2)

[14]

Question 7

- 7.1 A vehicle covers a distance of 180 km in 1 hour 30 minutes. Calculate the speed in km/h. (2)
- 7.2 Lea, Paul and Tynos invest in a business in the ratio 1: 3: 5. If the profit from the business is R450 000, how much does Tynos get? (2)
- 7.3 Paul invests R200 in a bank at 6% compound interest per year. How much money will he have at the end of 3 years? (3)
- 7.4 Megan wants to buy a radio, but cannot afford to pay the total amount of R999 all at once. She pays a deposit of 10% and the rest over 3 years at 25% simple interest per year. 36 equal monthly payments are made.
- 7.4.1 On what amount will she pay 25% interest? (1)
- 7.4.2 Calculate the total amount she must pay in the next three years. (4)
- 7.4.3 Calculate the monthly payment. (2)
- [14]

Question 8



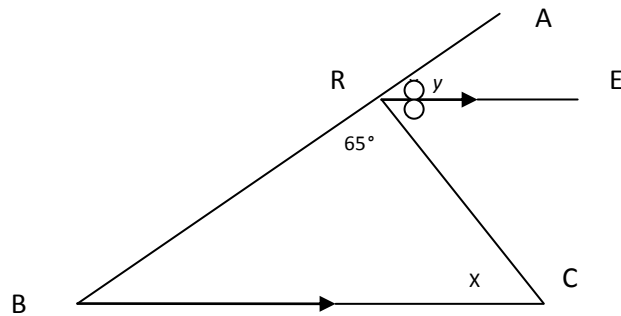
Draw the images of the following transformations on the grid provided at the end of the paper:

- 8.1 Move $\triangle A$ one unit to the right and two units up. Name the image B (2)
- 8.2 Reflect $\triangle A$ in the x-axis and name the image C (2)
- 8.3 Reflect $\triangle A$ about the line $y = -x$. Name the image D (2)
- [6]

Question 9

9.1

(3)



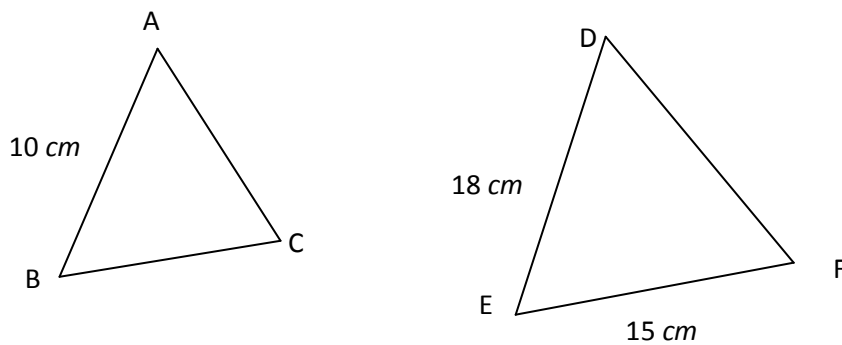
In $\triangle RBC$ is $\widehat{ARE} = \widehat{CRE}$. Determine the values of x and y with reasons

9.2 Give TWO properties of similar triangles

(2)

9.3 In the triangles below is $\widehat{A} = \widehat{D}$ and $\widehat{B} = \widehat{E}$. Determine the length of BC .

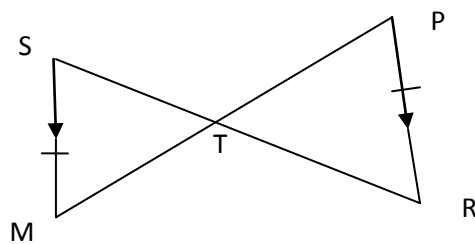
(3)



9.4 Are the following figures congruent? Give a reason for your answer.

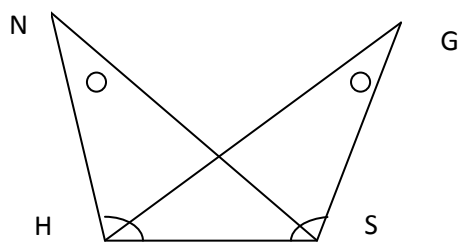
9.4.1

(2)

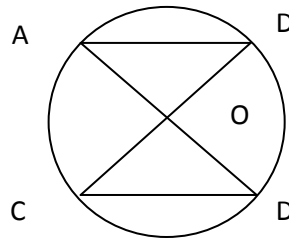


9.4.2

(2)



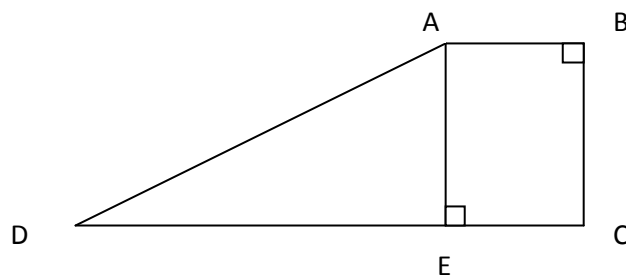
- 9.5 O is the midpoint of the circle. Prove $\triangle AOD \equiv \triangle BOC$ with reasons (4)



[16]

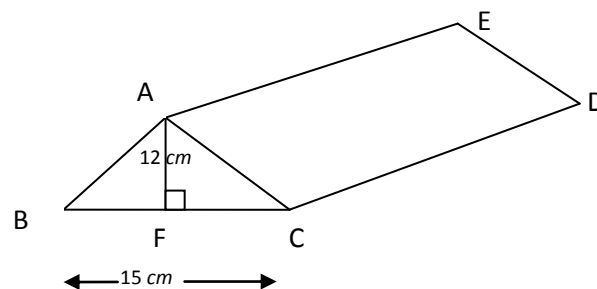
Question 10

- 10.1 The diagram shows the plan of a park. $AD = 100\text{ m}$, $BC = 80\text{ m}$ and $AB = 30\text{ m}$



- 10.1.1 Calculate the distance from C to D (4)
- 10.1.2 The area of the park (4)
- 10.2 Calculate the height of a cylindrical can with a capacity of 0,555 litres if $\pi = \frac{22}{7}$ and $r = 5\text{ cm}$ (4)

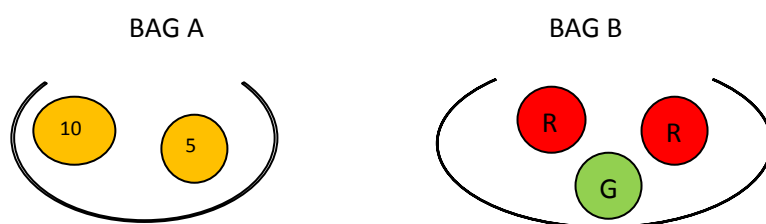
10.3



- 10.3.1 Calculate the volume of the triangular prism (3)

- 10.3.2 Calculate the length of AC if $AF = 12\text{ cm}$, $BC = 15\text{ cm}$ and $BF = DC$ (3)
[18]

Question 11



In Bag A there is a 10c and a 5c piece. In Bag B there are 2 red marbles and one green marble. One item is drawn from Bag A and then from Bag B in that order.

- 11.1 Draw a tree-diagram to determine all the possible outcomes. (3)
11.2 How many outcomes are there? (1)
11.3 What is the probability that you will draw a green marble and a 10c piece with your first draw? (2)
[6]

Question 12

The data shows the ages of passengers travelling on a bus from Johannesburg to Durban.

23	15	34	52	21	45	56	32	49	19
34	18	7	31	69	50	28	15	44	34
16	3	45	18	37	55	27	34	51	25

- 12.1 Determine the range in ages. (1)
12.2 Calculate the mean age of the passengers on the bus, to the nearest whole number. (2)
12.3 Copy and complete the frequency table below: (7)

Ages in years	Tally marks	Frequency
$0 < x \leq 10$		
$10 < x \leq 20$		
$20 < x \leq 30$		
$30 < x \leq 40$		
$40 < x \leq 50$		
$50 < x \leq 60$		
$60 < x \leq 70$		

12.4 Draw a histogram from the data.

(4)

[14]

TOTAL:140

ANNUAL NATIONAL ASSESSMENT EXEMPLAR 6

Question 1

Circle the letter of the correct answer:

1.1 The value of $(4 \times 9 + 4)(6 - 2 \times 3)$ is equal to ...

A 40

B 0

- C 30
- D -40

1.2 The compound interest on R10 000 at 20% per annum (per year) for 3 years, compounded annually (yearly) is ...

- A R7 280
- B R3 640
- C R364
- D R728

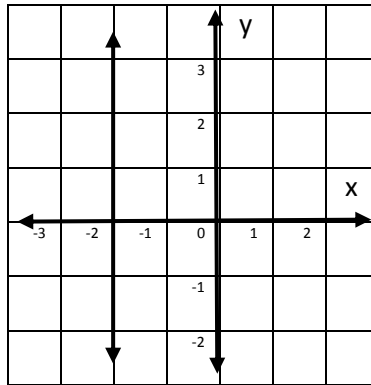
1.3 Calculate the value of $\sqrt{\sqrt{36} - \sqrt{4}} = \dots$

- A $\sqrt{2}$
- B $\sqrt{6} - \sqrt{2}$
- C 2
- D $6 - 2 = 4$

1.4 Which of the following is **NOT** a prime number?

- A $2^2 - 2 + 1$
- B $2^3 - 2^2 + 2 - 1$
- C $2^4 - 2^3 + 2^2 - 2 + 1$
- D $2^5 - 2^4 + 2^3 - 2^2 + 2 - 1$

1.5

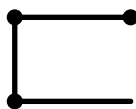


- A $x = 2$
- B $y = 2$
- C $x = -2$
- D $y = 2$

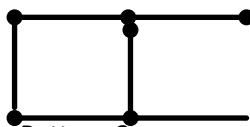
1.6 The sum of two consecutive numbers is S . The square of the larger number minus the square of the smaller number is ...

- A S^2
- B $2S$
- C S
- D $S + 1$

1.7 Look at the first two patterns:



Pattern 1



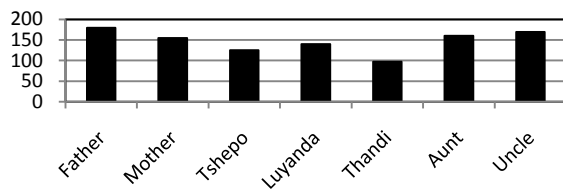
Pattern 2

Pattern 3

How many sticks will Pattern 3 have?

- A 6
- B 9
- C 12
- D 15

1.8 The bar graph below shows their respective heights in centimetres.



Who is the shortest member of the family?

- A Father
- B Aunt
- C Thandi
- D Tsepho

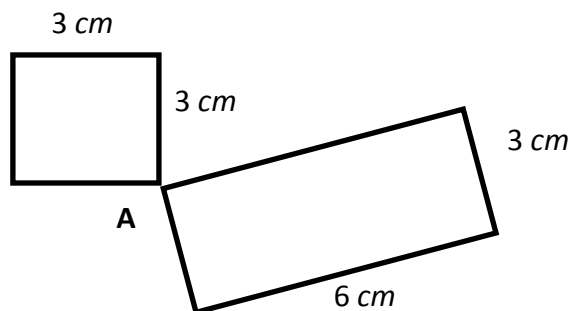
- 1.9 The following two-way contingency table was used at the 2012 London Olympic Games for Event A (Men) and Event B (women)

Athletics items	Men	Women
Track athletes	TM	TW
Field Athletes	FM	FW
Spectators	SM	SW

The probability of track, field and spectator male(M) involvement is:

- A $P(\text{men}) = \frac{1}{2}$
- B $P(\text{men}) = \frac{1}{3}$
- C $P(\text{men}) = \frac{1}{6}$
- D $P(\text{men}) = 0$

- 1.10 Two ants start at point A and walk at the same pace. One ant covers a perimeter of 12 *cm* whilst the other ant covers a perimeter of 18 *cm*. What is the minimum distance, in centimetres, any one must cover before they meet again?



- A 18

- B 72
C 216
D 36

[10]



Question 2

2.1 Complete the following table:

(6)

	Number	N	N_0	Z	Q	Q'	R
Example	2	✓	✓	✓	✓	x	✓
2.1.1	$2\frac{1}{3}$						
2.1.2	$-2.\dot{3}$						
2.1.3	$\sqrt{25+9}$						

2.2 Look at the exchange rates below:

South Africa Rand		Euro
1 ZAR = 0.0867252 EUR		1 EUR = 11.5307 ZAR

2.2.1 How many Rand are there are in 255 Euros?

(2)

2.2.2 How many Euros are in R1 300?

(2)

2.3 The international call tariffs of Telkom are given in the following table:

Number of minutes	3	5	9	y
Cost	R4,95	R8,25	x	R28,05

2.3.1 Is the proportion direct or indirect? Why?

(2)

2.3.2 Determine the cost of a 9-minute call (x)

(3)

2.3.3 Determine the duration of a call if the cost is R28,05 (y)

(3)

2.4 Sipho's calculations below shows how 10% compound interest over a period of 2 years can make an investment amount of R5 000 grow to

(4)

$$R6\ 050. \quad [A = P(1 + \frac{r}{100})^n]$$

What will the investment amount be after 5 years? Show all calculations.

[22]

Question 3

Simplify:

3.1 $xy^2 - 2x^2y - 7xy^2 + 8x^2y - 2x^2$ (2)

3.2 $-7y(2xy - 4x)$ (2)

3.3 $(2x - 4)^2$ (3)

3.4 $\frac{2m+4}{m-3} \times \frac{m^2-3m+2}{m^2-4}$ (4)

3.5 $\frac{a^{-3}b^2}{a^2b^4}$ (2)

[13]

Question 4

Solve the following equations:

4.1 $xy^2 - 2x^2y - 7xy^2 + 8x^2y - 2x^2$ (3)

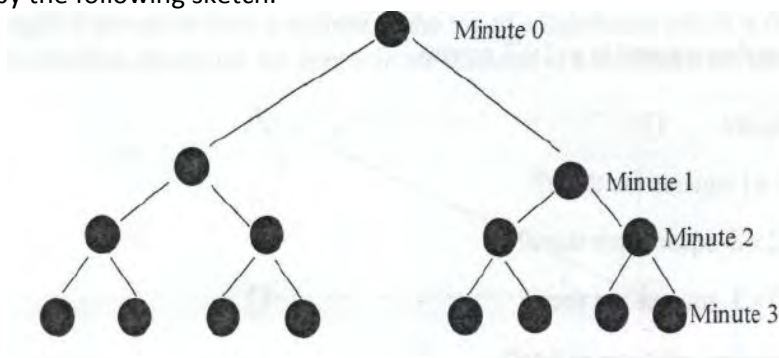
4.2 $-7y(2xy - 4x)$ (3)

4.3 $(2x - 4)^2$ (4)

[10]

Question 5

Viruses multiply at an enormous tempo. The way in which a virus multiplies can be represented by the following sketch:



5.1 Say a virus doubles every minute. Redraw and complete the table to show how the virus multiplies. (5)

Minute	0	1	2	3	4	5
Number of viruses	1					

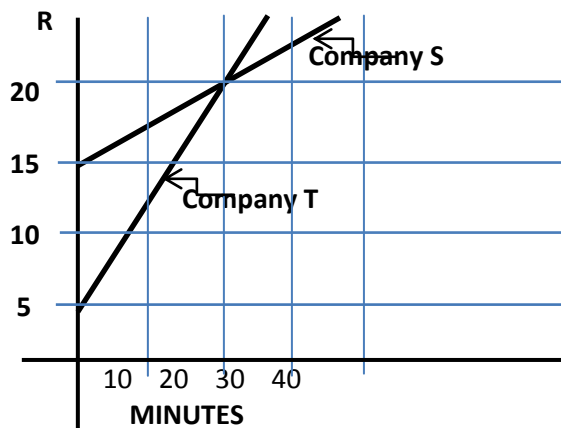
5.2 Write down a formula that indicates how many viruses there will be after 10 (2)

minutes.

Question 6

6.1

CELL PHONE COMPANIES



Use the given graph and answer the questions:

Use the given graphs and answer the questions:

6.1.1 At how many minutes do both companies charge the same rate? (1)

6.1.2 When is company T's rates lower than that of Company S? (2)

6.2 Complete the table and draw on the graph of $y = x + 1$ for $x \in R$ (6)

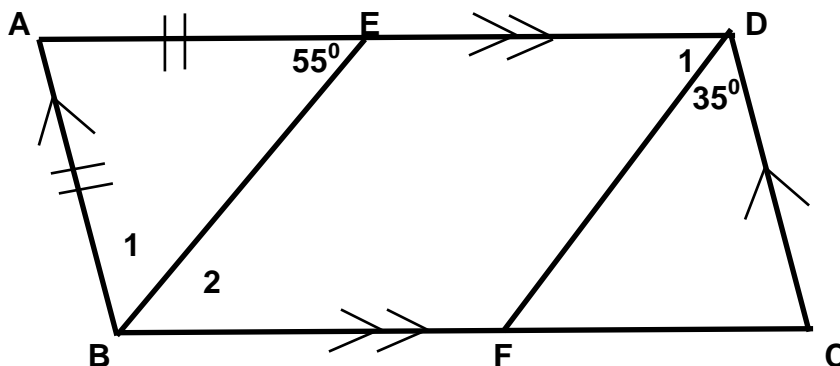
x	-3	-2	-1	0	1	2	3
$y = x + 1$				1			

6.3 Marie has saved R10,02. She finds that this amount is made up of equal numbers of 2c, 5c, 10c, 50c, and R1 coins. What is the total number of coins she has? Show all calculations. (5)

[14]

Question 7

7.1



ABCD is a parallelogram with $AD \parallel BC$, $AB \parallel DC$, $AE = AB$, $\angle AEB = 55^\circ$ and $\angle FDC = 35^\circ$. Determine, with reasons, the size of:

7.1.1 \hat{B}_1 (2)

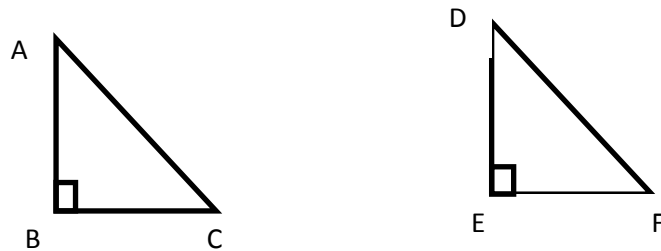
7.1.2 \hat{A} (3)

7.1.3 \hat{C} (2)

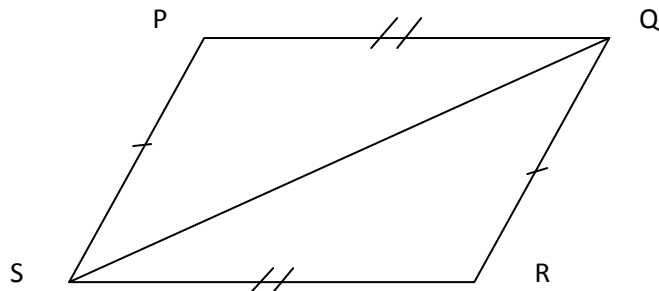
7.1.4 \hat{B}_2 (2)

7.1.5 \hat{D}_1 (3)

7.2 Which two sides must be equal to prove the two triangles congruent? (2)



7.3 Quadrilateral PQRS with $PQ = RS$ and $PS = RQ$ (4)

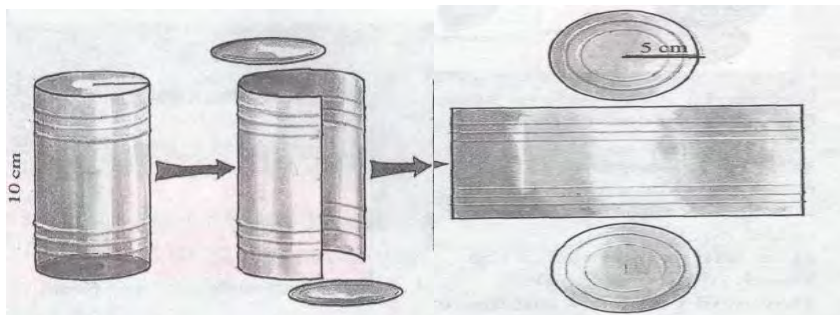


Prove $\triangle PQS \equiv \triangle RSQ$ with reasons

[18]

Question 8

8.1 (3)



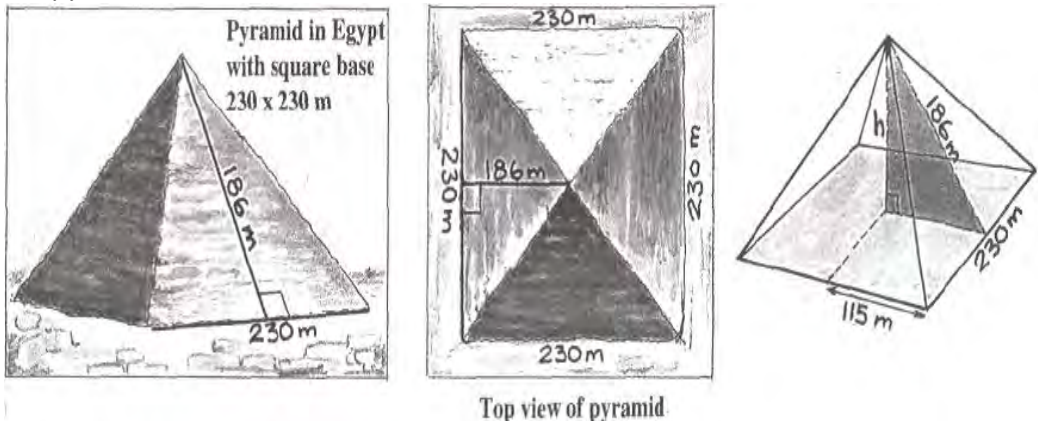
The sketch above represents a tin with height 10 cm and radius 5 cm.

$\pi = 3,14$

Calculate the total surface area of the tin

8.2 Will a rectangular sheet of metal, 52cm long and 10cm wide, be enough metal to make this tin? Show all calculations. (3)

8.3 The length down the face of a pyramid is 186m and the sides of the square base of the pyramid are 230m. (3)

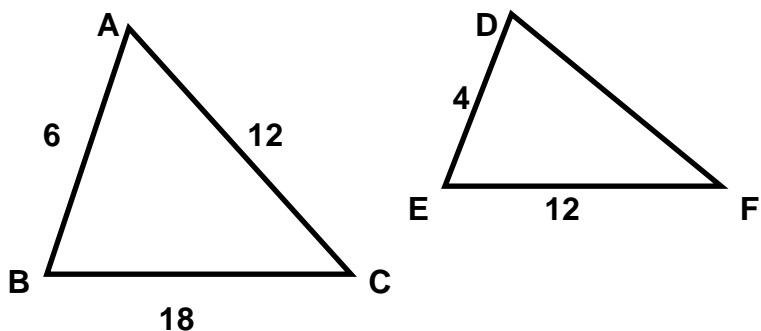


What is the height of the pyramid? Show all calculations. Round off to one decimal

[9]

Question 9

9.1 (4)



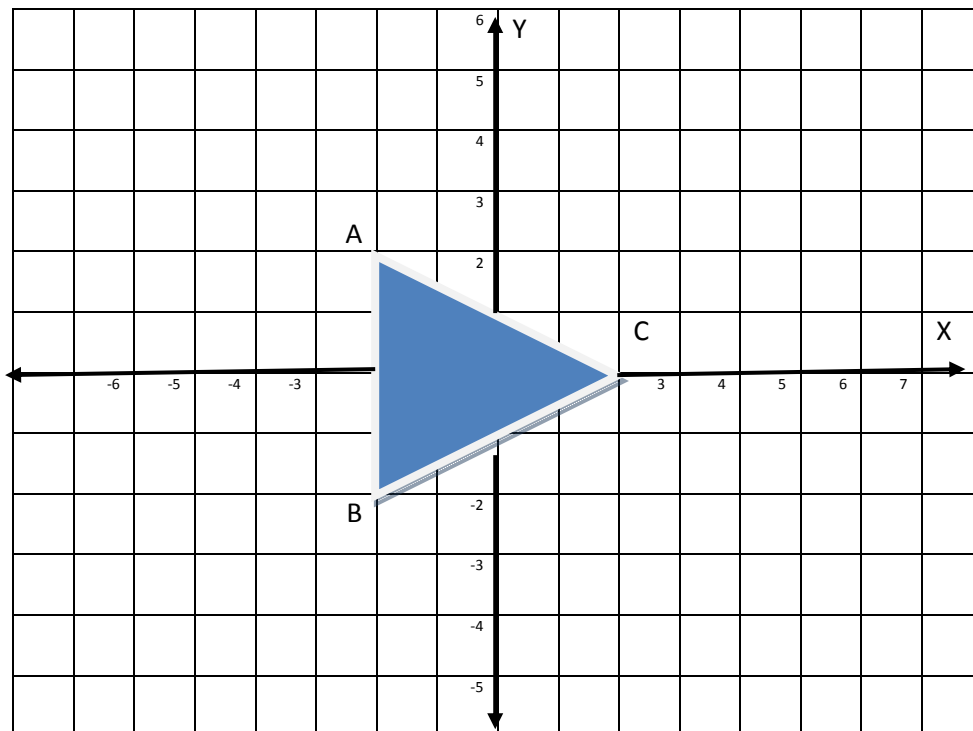
$\triangle ABC \sim \triangle DEF$ with $\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$
Calculate the length of DF

9.2 Complete the following table: (4)

Platonic solid	Name of solid	Number of edges	Number of vertices	Number of faces

9.3 Enlarge $\triangle ABC$ to a scale factor of 2 and call it $\triangle A'B'C'$. Write down the co-ordinates (4)

of the vertices of $\Delta A'B'C'$



[12]

Question 10

10.1 A group of 14 learners measure their height and foot sizes and tabulate their results.

Height (cm)	174	158	163	175	140	126	153	160	160	131	156	165	158	120
Foot (cm)	27	24	24	26	23	23	22	25	24	20	23	25	24	20

10.1.1 Draw a scatter plot of the given information (7)

10.1.2 According to the graph, do the taller people generally have longer feet lengths and why? (2)

10.2 An 8-sided die has the numbers 1 to 8 on its faces. When thrown, it has an equal chance of landing on any one of its faces.



10.2.1 How many possible outcomes are there? (1)

10.2.2 What is the probability that it will land on a prime number? (1)

10.2.3 What is the probability that it will land on a number less than 0? (1)

10.3 The given data set represents the weight to the nearest kg of a group of learners.

82	73	65
42	55	62
65	58	68
51	65	72
63	48	65

10.3.1 Draw a stem and leaf diagram for the data (5)

10.3.2 Determine the range of the data (2)

10.3.3 Determine the mode (1)

10.3.4 Determine the mean (3)

10.3.5 Determine the median (2)

[25]

TOTAL: 140