Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2018

MATHEMATICS

MARKS: **140**

TIME: **2½ hours**

9MATHS

This question paper consists of 18 pages, including 2 annexures.

INSTRUCTIONS AND INFORMATION

1. Read the instructions for each question carefully before answering the questions.
2. This paper consists of NINE questions.
3. Answer ALL the questions.
4. Number your answers exactly as the questions are numbered in the question paper.
5. You may use an approved scientific calculator (non-programmable and non-graphical).
6. Clearly show ALL the calculations, diagrams and graphs etc. you have used in determining your answers.
7. Diagrams are NOT necessarily drawn to scale.
8. Write neatly and legibly.

QUESTION 1

Various options are given as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number, for example if the correct answer for 1.1 is A, write your answer as 1.1 A.

1.1 Which ONE of the following numbers is irrational?

A $3,\dot{7}$

B $\sqrt[3]{-27}$

C $-\sqrt{3}$

D $\sqrt{1\frac{7}{9}}$

(1)

1.2 When $\frac{3^x.3^{x+3}}{3^{x+2}}$ is simplified, the answer is:

A 3^{x+1}

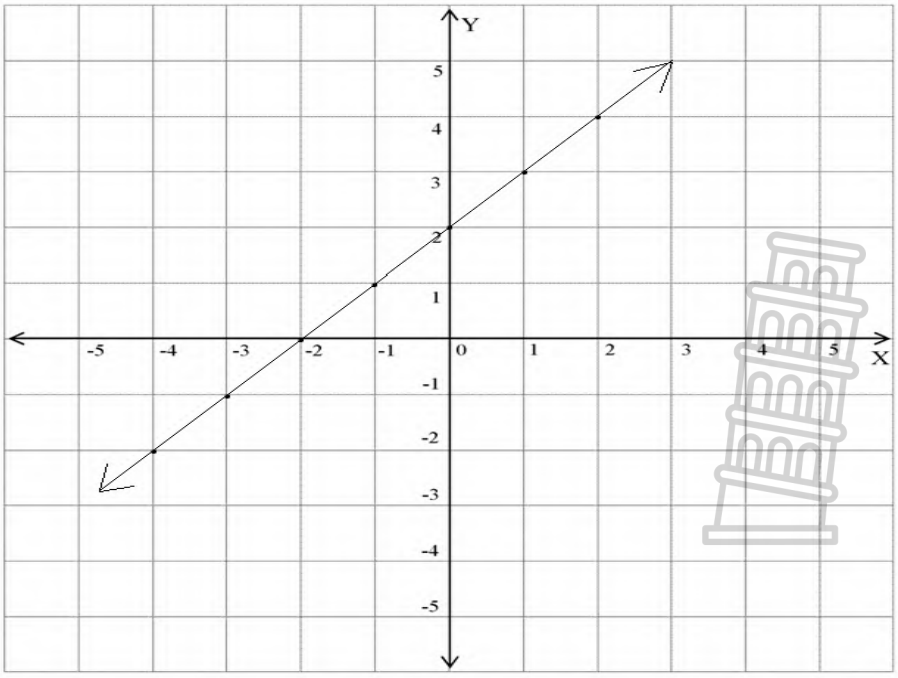
B 3^{x+5}

C 3^x

D $\frac{9^{2x+3}}{3^{x+2}}$

(1)

1.3 The equation of the straight line drawn below is:



A $y = 2x - 2$

B $y = x + 2$

C $y = -2x + 2$

D $y = -x - 2$

(1)

1.4 If $x(2x-8)=0$, then x is:

A 0 or 4
B 0 or -4
C 2 or -2
D None of the above (1)

1.5 The general rule (T_n) for the pattern $-5\ ;\ -1\ ;\ 3\ ;\ 7\ ;\ \ldots$ is:

A $T_n=4n+9$
B $T_n=-4n-9$
C $T_n=-4n+9$
D $T_n=4n-9$ (1)

1.6 The value (in scientific notation) of $5,2\times10^{-5}\times3\times10^{3}$ is:

A $15,6\times10^{-1}$
B $1,56\times10^{-1}$
C $0,156\times10^{1}$
D $15,6\times10^{1}$ (1)

1.7 A cylindrical cake has a diameter of 220 mm and a height of 100 mm
If the cake is cut into 12 equal size slices, the volume of each slice will be:
$\left(\text{Use } \pi=\frac{22}{7}\right)$

A 3 802 857 mm^3
B 1 267 619 mm^3
C 316 905 mm^3
D 15 211 429 mm^3 (1)

1.8 There are 3 green and 2 red balls in a bag. Two balls are drawn consecutively and then replaced after each ball is drawn. The probability that both balls will be green is:

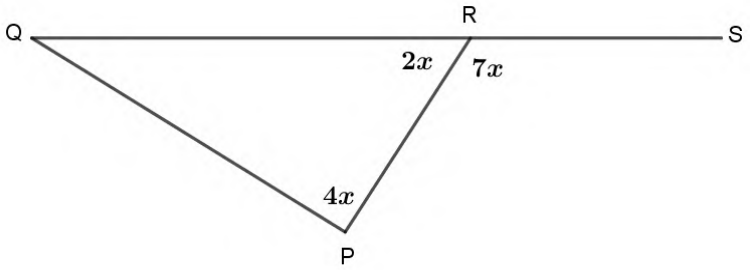
A 0
B 100%
C $\frac{3}{5}$
D $\frac{9}{25}$ (1)

1.9 If 12 workers clean up a certain stretch of the Swarkops River in 4 days, then 8 workers would have cleaned the same stretch in …

A 2 days.
B 24 days.
C 6 days.
D 3 days. (1)

1.10 In ΔPQR , QR is extended to S.

The size of $\angle Q$ is:



A 40°
B 20°
C 140°
D 60° (1)
[10]

QUESTION 2

2.1 Write 1 042 000 000 in scientific notation. (1)

2.2 Simplify:

2.2.1 $3z^2-\left(4\frac{2}{3}z^3\div\frac{7z}{2}\right)$ (3)

2.2.2 $2(x-3)^2-3(x+1)(2x-5)$ (3)

2.2.3 $\left(\frac{2x^{-1}y}{3y^2}\right)^{-2}$ (3)

2.2.4 $\frac{\sqrt{169x^6}\times\left(\frac{y}{p^{99}q}\right)^0}{\sqrt[3]{x^{12}}}$ (3)

2.3 Factorise completely:

2.3.1 $ax^2-5ax+6a$ (3)

2.3.2 $(2x-3y)+(3y-2x)x^2$ (3)

2.4 Solve for x:

2.4.1 $\frac{x}{2}+\frac{2x+3}{3}=1$ (2)

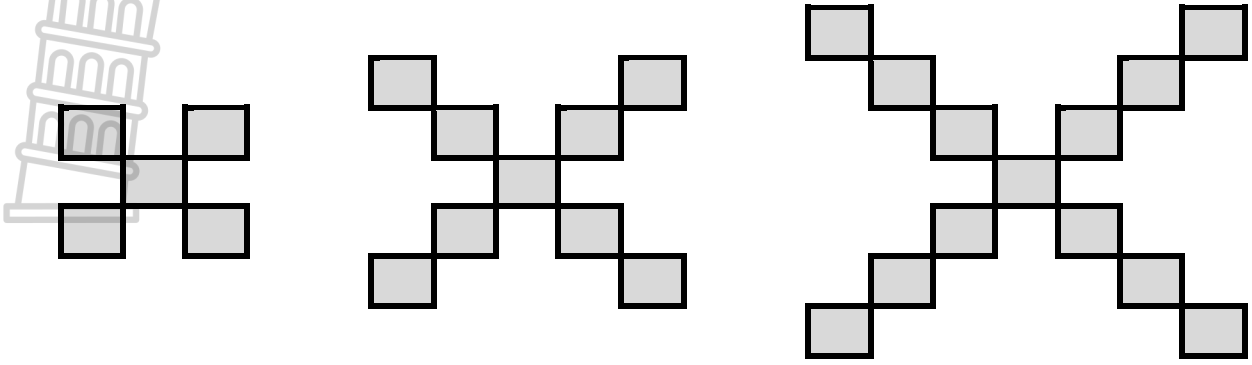
2.4.2 $x^2+x=12$ (2)

2.4.3 $5^{x+2}=\frac{1}{25}$ (2)

[25]

QUESTION 3

3.1 Consider the following shapes and answer the questions that follow.



Shape 1 **Shape 2** **Shape 3**

3.1.1 Refer to the table below and write down the values of *q* and *r.*

Shape	1	2	3	4	…	*r*
Number of rectangles	5	9	13	*q*	…	101

(1)

3.1.2 Determine the general rule (T_n) of the pattern. (2)

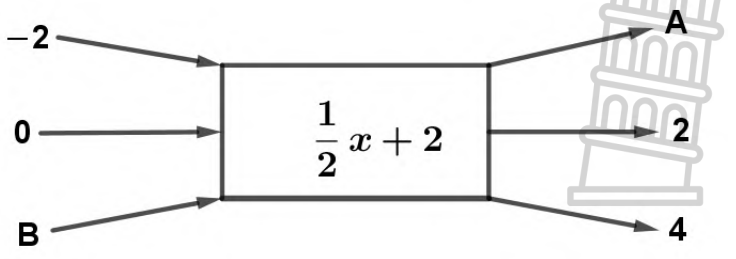
3.1.3 Hence, determine which shape will have 205 rectangles. (2)

3.2 Given the following number pattern: 2; 5; 10; 17; ...

3.2.1 Provide a rule to describe the relationship between the numbers in this number pattern. (2)

3.2.2 Use your rule to find the 10th term in this number pattern. (2)

3.3 Read the flow diagram below and answer the questions that follow.



3.3.1 What is the output value in **A**? (2)

3.3.2 What is the input value in **B**? (2)

3.4 Use the table below to answer the questions that follow.

x	–3	–2	–1	0	…	q
y	–10	–7	–4	–1	…	8

3.4.1 Find the rule in the form $y = ...$ (2)

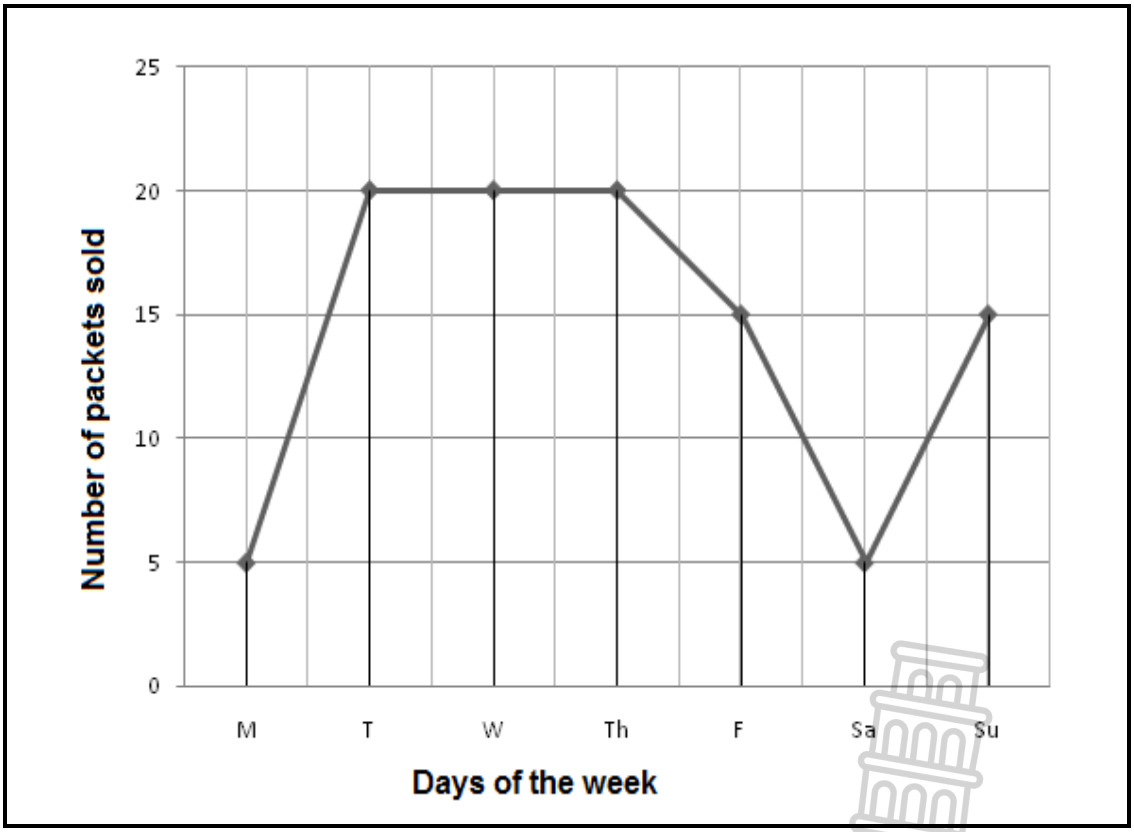
3.4.2 Determine the value of q. (2)

3.5 A straight-line graph is defined by $y = -x + 3$.

3.5.1 Determine the X-intercept of the graph. (1)

3.5.2 Draw the graph showing all your intercepts with the axes. Use ANNEXURE 1. (3)

3.6 The following graph shows the number of packets of sweets that a shop owner sold during a week.



3.6.1 On which days was there an increase in sales? (1)

3.6.2 What was the amount of the increase shown on the days mentioned in QUESTION 3.6.1? (1)

3.6.3 On which days was there a decrease in sales? (1)

3.6.4 Was the decrease constant or did it vary? (1)

3.6.5 What happened from Tuesday to Thursday regarding the number of packets sold? (1)

[26]

QUESTION 4

4.1 Dhanielle invests R 1 800 for 5 years at r % simple interest per annum. The interest on the investment is R720. Calculate the interest rate. (3)

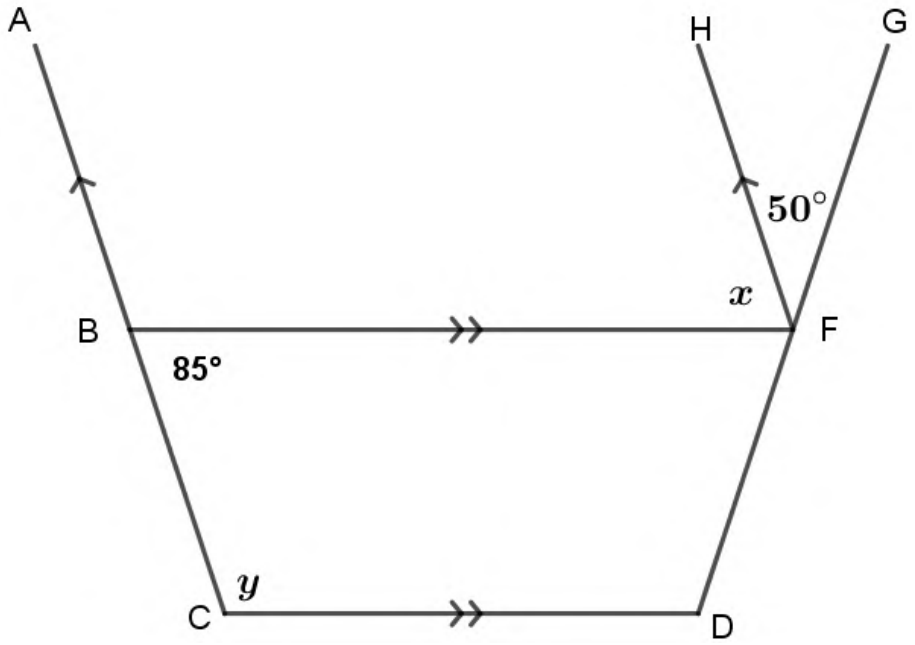
4.2 A playground is in the form of a rectangle with the length 1 m longer than the breadth. A new rectangular playground is planned that will be 3 m longer than the original length and with a breadth 1 m shorter than that of the original breadth. Determine the difference in perimeter of the two playgrounds. (5)

4.3 Lenneth drives from Cape Town to Worcester, a distance of 120 km, in 1 hour 30 minutes. He then drives from Worcester to Stellenbosch, a distance of 90 km, in 1 hour. Calculate the average speed at which he travelled. (4)

[12]

QUESTION 5

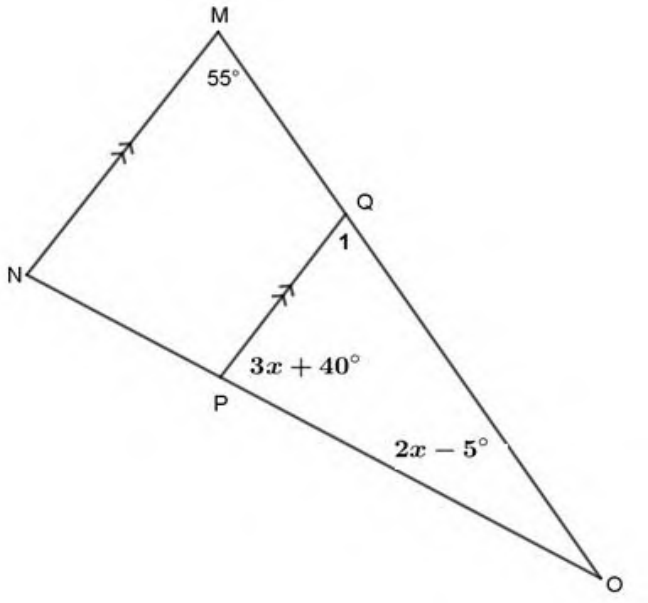
5.1 In the diagram below AC ∥ HF and BF ∥ CD. $\angle CBF = 85^\circ$ and $\angle GFH = 50^\circ$ Find with reasons, the size of:



5.1.1 x (2)

5.1.2 y (2)

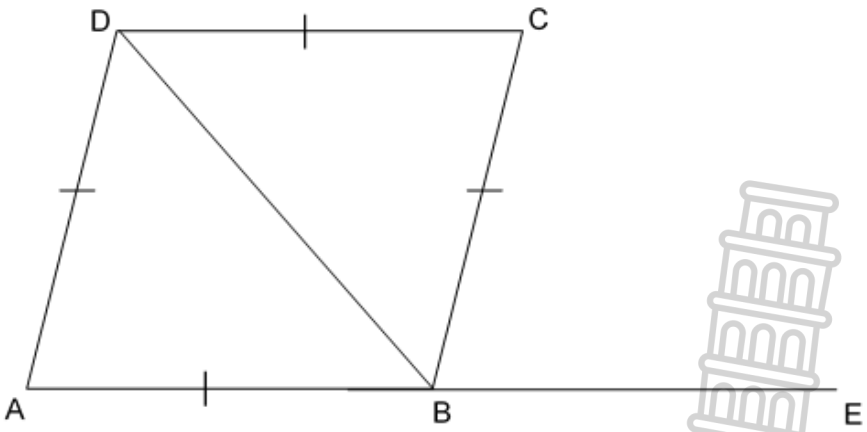
5.2 In the diagram below is ΔMNO with MN ∥ QP, $\angle OMN = 55^\circ$, $\angle QPO = 3x + 40^\circ$ and $\angle MON = 2x - 5^\circ$.



5.2.1 Calculate the value of x. Give reasons for your answer. (4)

5.2.2 Calculate the actual size of $\angle MON$. (2)

5.3 The diagram below is rhombus ABCD with diagonal BD. AB is extended to E and $\hat{A} = 70^0$.



5.3.1 Calculate, with reasons, the size of $\angle ADB$. (3)

5.3.2 Calculate, with reasons, the size of $\angle ADC$. (3)

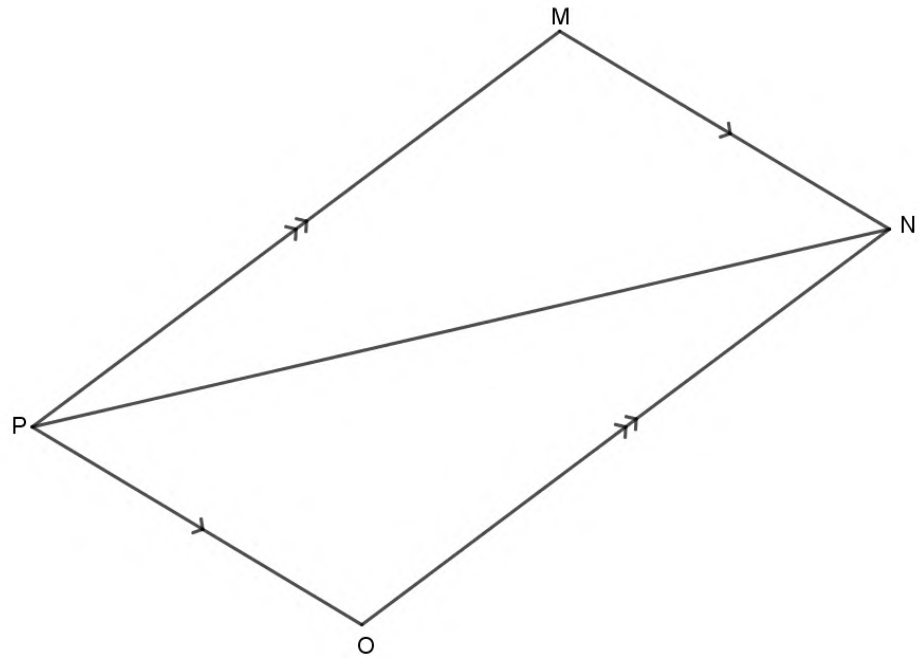
5.3.3 Calculate, with reasons, the size of $\angle DBE$. (2)

5.3.4 Give a reason why $\angle ABD = \angle BDC$. (1)

[19]

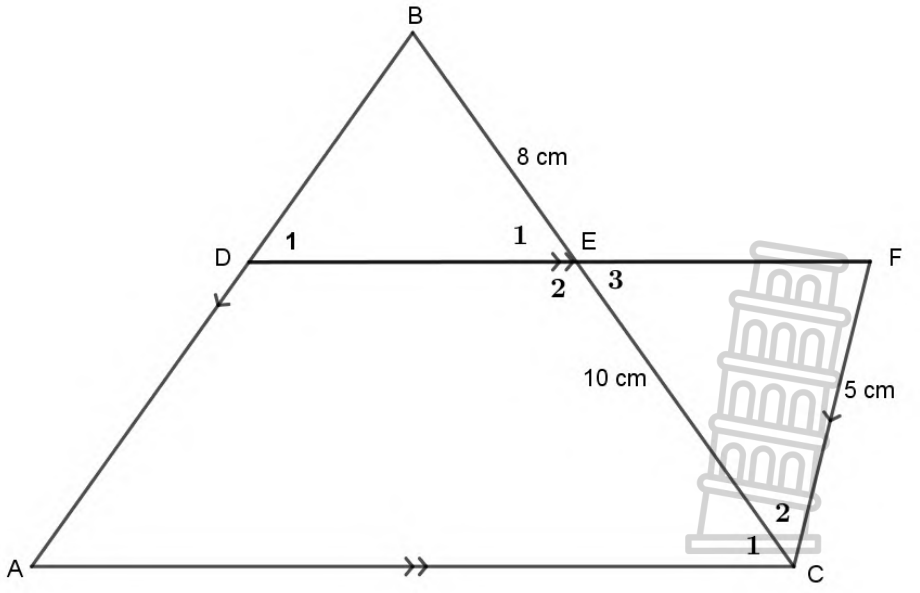
QUESTION 6

6.1 In parallelogram MNOP with diagonal PN, MN ∥ PO and MP ∥ NO.



Use congruency to prove that $PM = NO$. (5)

6.2 In the diagram below, AC ∥ DF, AB ∥ CF, BE = 8 cm, EC = 10 cm and CF = 5 cm.



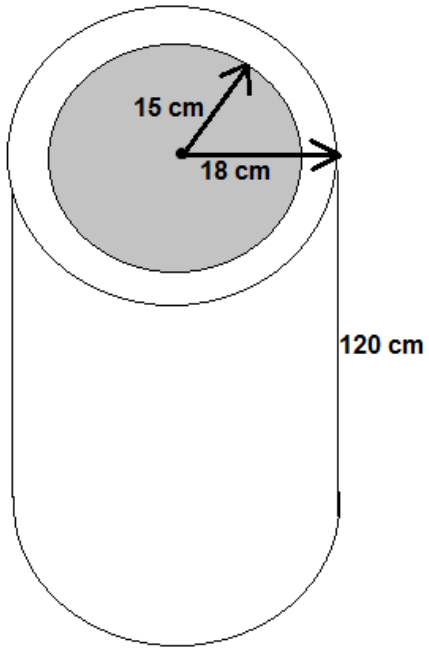
6.2.1 Prove that $\Delta DBE \,|||\, \Delta FCE$. (4)

6.2.2 Hence, determine the length of DB. (3)

[12]

QUESTION 7

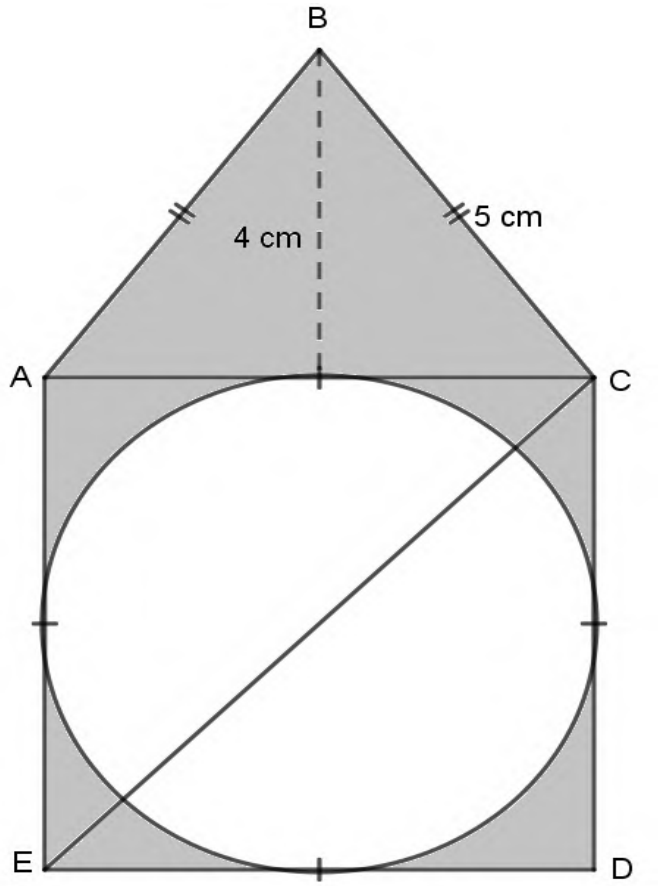
7.1 A water pipe is cast in concrete. The inner radius of the pipe is 15 centimetres and the outer radius is 18 centimetres. The height of the pipe is 120 centimeters.



7.1.1 Determine, correct to TWO decimal places, the total surface area in cm^2 if the pipe is open on both ends. (4)

7.1.2 Determine, correct to TWO decimal places, the volume in cm^3 of concrete needed to make a 120-centimetre-long pipe. (4)

7.2 In the diagram is an isosceles triangle ABC with $BC = 5\text{ cm}$ and height $BF = 4\text{ cm}$. Square ACDE has an enclosed circle touching all four of its sides.

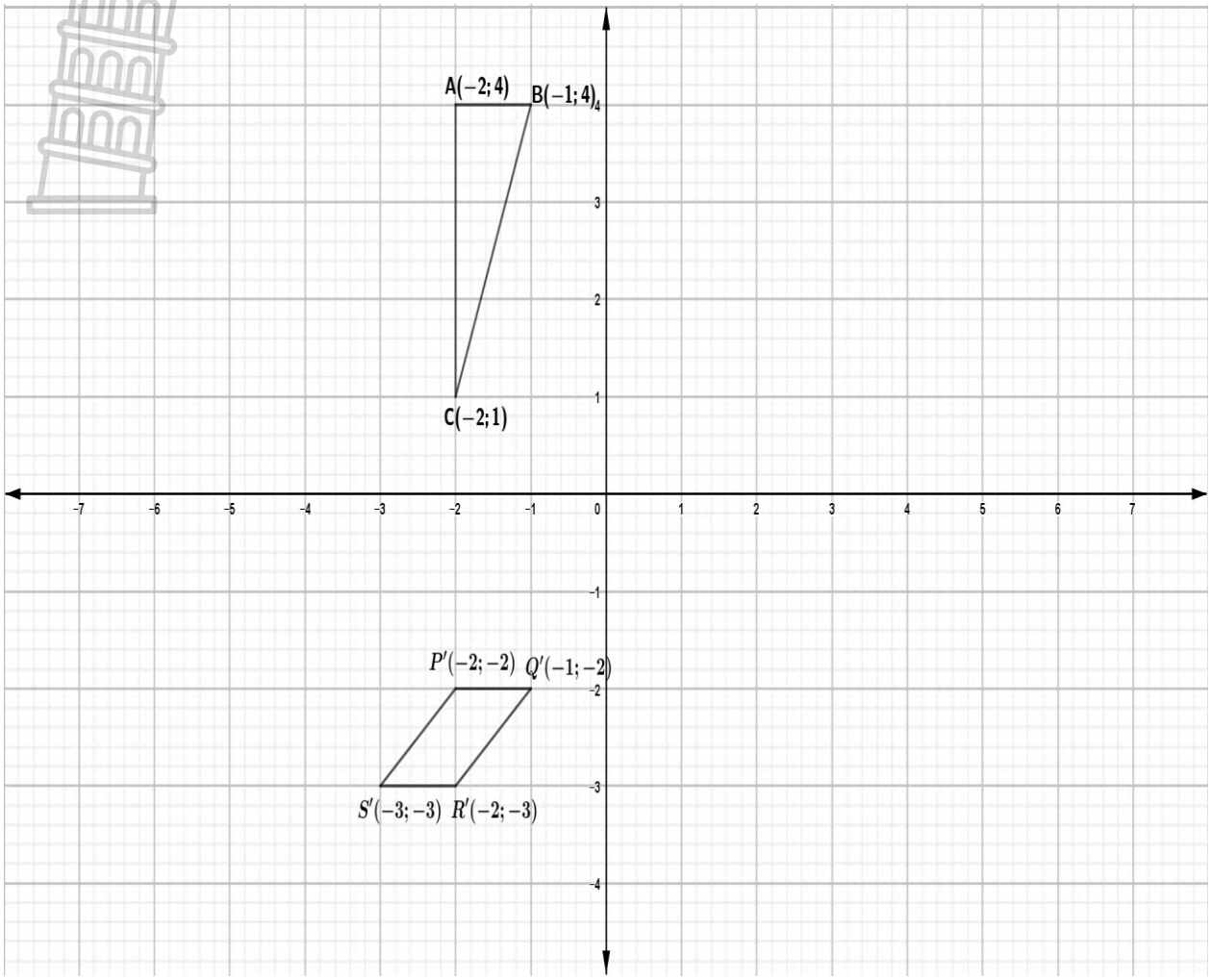


Calculate the shaded area in the diagram, correct to two decimal places, if the height of the triangle is h = 4 cm. (5)

[13]

QUESTION 8

Use the diagram given below and answer the following questions.



8.1 ΔABC is reduced by a scale factor of ½ about the origin.
Draw $\Delta A'B'C'$ on ANNEXURE 2. (3)

8.2 Reflect ΔABC in the line $y = x$ to form $\Delta A''B''C''$.
Draw $\Delta A''B''C''$ on ANNEXURE 2. (3)

8.3 Quadrilateral P′Q′R′S′ is the image of quadrilateral PQRS being translated according to the following rule: $(x;y) \rightarrow (x+1;y-2)$
Draw the original quadrilateral PQRS on ANNEXURE 2. (4)
[10]

QUESTION 9

9.1 All the Grade 9 learners of a school were asked whether they had cellphones or not. If they had one, they also had to indicate whether they had it on a contract, with the phone being paid for by the parent/guardian or whether it was pre-paid. Their responses are shown in the table below:

	Contract	Pre-paid	No cellphone	Total
Boys	***a***	57	24	100
Girls	23	***b***	37	150
Total	42	147	***c***	250

9.1.1 Calculate the value of **a**, **b** and **c** in the table. (2)

9.1.2 If a Grade 9 learner is chosen at random from this school, what is the probability that this learner will be:

(a) A girl? (2)

(b) A boy owning a cellphone? (2)

(c) A learner with no cellphone? (2)

9.2 The mean monthly salary of all the staff at company Gringos is R7 550 per month, but the median salary is R5 225.

9.2.1 Explain and give a reason why the two summary statistics are so different. (3)

9.2.2 Which summary statistic gives a better idea of the salaries at the company? Give a reason for your answer. (2)

[13]

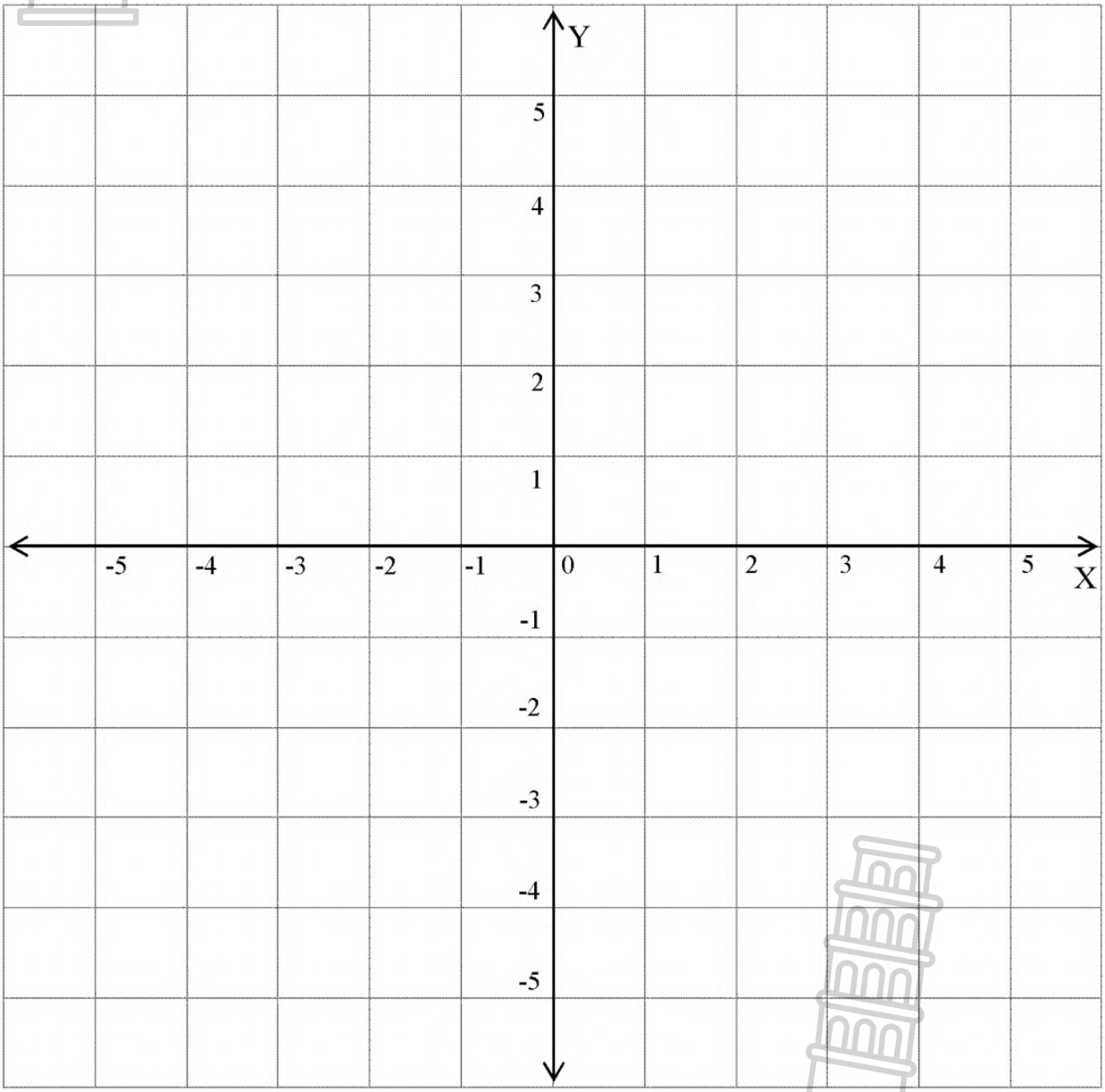
TOTAL: 140

ANNEXURE 1

QUESTION 3.5.2

NAME: _____

SURNAME: _____

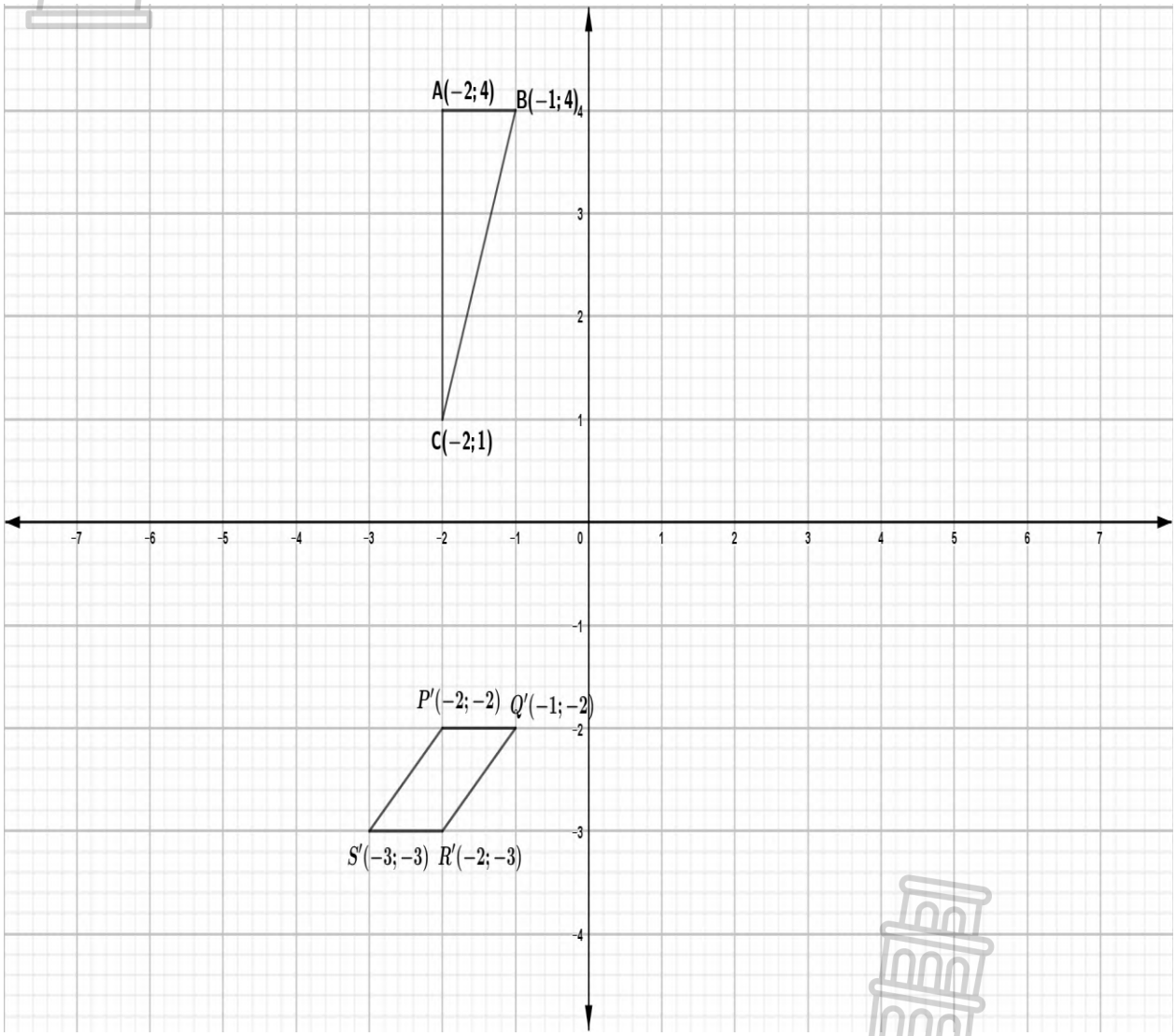


ANNEXURE 2

QUESTION 8.1; QUESTION 8.2 and QUESTION 8.3

NAME: _____

SURNAME: _____



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EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2018

MATHEMATICS
MARKING GUIDELINE

MARKS: 140

This marking guideline consists of 13 pages.

INSTRUCTIONS AND INFORMATION

1. Give full marks for answers only, unless stated otherwise.
2. Accept any alternate correct solutions that are not included in the marking guideline.
3. Underline errors committed by learners and apply Consistent Accuracy (CA).
4. **THE FINAL MARK MUST BE CONVERTED TO 100.**

KEYS	
M	Method
CA	Consistent Accuracy
A	Accuracy
S	Statement
SF	Substitution in Formula
R	Reason
S/R	Statement and Reason

QUESTION 1 [10 marks]

Ques.	Mark allocation			Total
1.1	C	✓		(1)
1.2	A	✓		(1)
1.3	B	✓		(1)
1.4	A	✓		(1)
1.5	D	✓		(1)
1.6	B	✓		(1)
1.7	C	✓		(1)
1.8	A	✓		(1)
1.9	C	✓		(1)
1.10	D	✓		(1)
				[10]

QUESTION 2 [25]

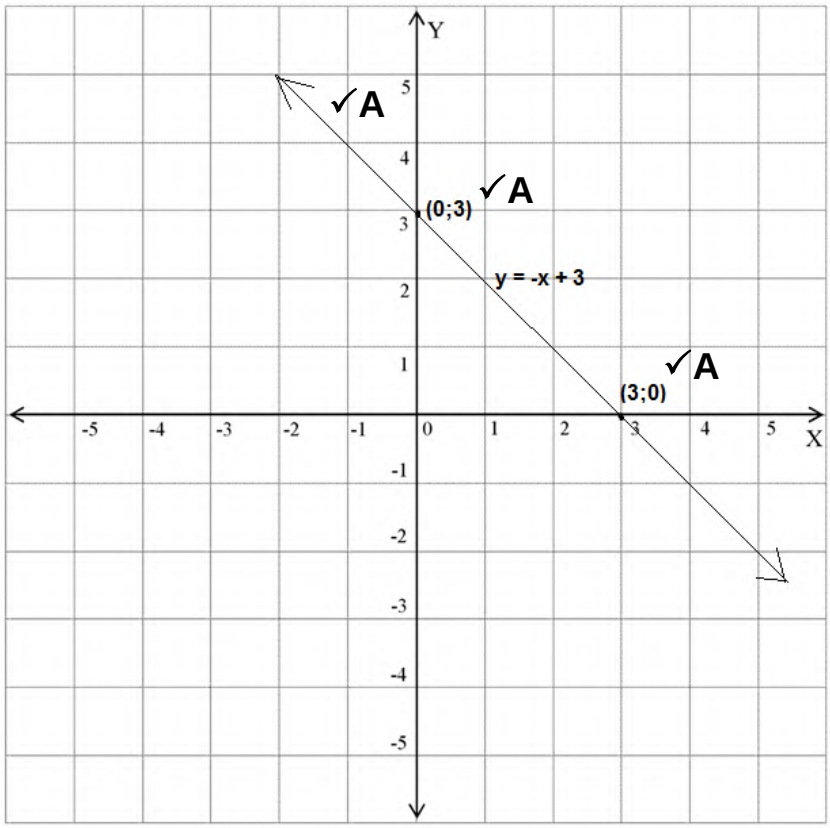
Ques.	Solution	Mark allocation	Total
2.1	$1\ 042\ 000\ 000 = 1,042\times10^{9}$ ✓**A**	Answer: 1Mark	(1)
2.2.1	$3z^2-\left(4\frac{2}{3}z^3\div\frac{7z}{2}\right)$ $=3z^2-\left(4\frac{2}{3}z^3\div\frac{7z}{2}\right)$ ✓ **M** $=3z^2-\frac{4z^2}{3}$ ✓ **M** $=\frac{5z^2}{3}/\frac{5}{3}z^2$ ✓**CA**	$\left(\frac{14z^3}{3}\times\frac{2}{7z}\right)$: 1 Mark $\frac{4z^2}{3}$: 1 Mark Answer: 1 Mark	(3)
2.2.2	$2(x-3)^2-3(x+1)(2x-5)$ $=2(x^2-6x+9)-3(2x^2-3x-5)$ ✓**M** ✓**M** $=2x^2-12x+18-6x^2+9x+15$ $=-4x^2-3x+33$ ✓**CA**	(x^2-6x+9): 1 Mark $(2x^2-3x-5)$: 1 Mark Answer: 1 Mark	(3)
2.2.3	$\left(\frac{2x^{-1}y}{3y^2}\right)^{-2}$ $=\left(\frac{2y}{3xy^2}\right)^{-2}$ ✓**M** $=\left(\frac{3xy^2}{2y}\right)^{2}$ ✓**M** $=\frac{9x^2y^2}{4}$ ✓**CA** **OR** $\left(\frac{2x^{-1}y}{3y^2}\right)^{-2}$ $=\frac{2^{-2}x^2y^{-2}}{3^{-2}y^{-4}}$ ✓**M** $=\frac{\frac{1}{4}x^2y^2}{\frac{1}{9}}$ ✓**M** $=\frac{9}{4}x^2y^2$ ✓**CA** **OR**	$\left(\frac{2y}{3xy^2}\right)^{-2}$: 1 Mark $\left(\frac{3xy^2}{2y}\right)^{2}$: 1 Mark Answer: 1 Mark **OR** $\frac{2^{-2}x^2y^{-2}}{3^{-2}y^{-4}}$: 1 Mark $\frac{\frac{1}{4}x^2y^2}{\frac{1}{9}}$: 1 Mark Answer: 1 Mark **OR**	

Ques.	Solution	Mark allocation	Total
	$\left(\frac{2x^{-1}y}{3y^2}\right)^{-2}$ $=\frac{1}{\left(\frac{2x^{-1}y}{3y^2}\right)^2}$ ✓M $=\frac{1}{\frac{2^2x^{-2}y^2}{3^2y^4}}$ ✓M $=\frac{9x^2y^2}{4}$ ✓CA	$\frac{1}{\left(\frac{2x^{-1}y}{3y^2}\right)^2}$: 1 Mark $\frac{1}{\frac{2^2x^{-2}y^2}{3^2y^4}}$: 1 Mark Answer: 1 Mark	(3)
2.2.4	$\frac{\sqrt{169x^6}\times\left(\frac{y}{p^{99}q}\right)^0}{\sqrt[3]{x^{12}}}$ ✓M $=\frac{13x^3\times1}{x^4}$ ✓M $=\frac{13}{x}$ ✓A	$13x^3$: 1 Mark x^4: 1 Mark Answer: 1 Mark	(3)
2.3.1	$ax^2-5ax+6a$ ✓M $=a(x^2-5x+6)$ ✓CA $=a(x-3)(x-2)$	$a(x^2-5x+6)$: 1 Mark $(x-3)$: 1 Mark $(x-2)$: 1 Mark	(3)
2.3.2	$(2x-3y)+(3y-2x)x^2$ $=(2x-3y)-(2x-3y)x^2$ ✓M $=(2x-3y)(1-x^2)$ ✓CA $=(2x-3y)(1+x)(1-x)$ ✓CA	$(2x-3y)-(2x-3y)x^2$: 1 Mark $(2x-3y)(1-x^2)$: 1 Mark $(2x-3y)(1+x)(1-x)$: 1 Mark	(3)
2.4.1	$\frac{x}{2}+\frac{2x+3}{3}=1$ $\therefore 6\left(\frac{x}{2}\right)+6\left(\frac{2x+3}{3}\right)=6(1)$ ✓M $\therefore 3x+4x+6=6$ $\therefore 7x=0$ $\therefore x=0$ ✓CA	× by LCM: 1 Mark Answer: 1 Mark	(2)

Ques.	Solution	Mark allocation	Total
2.4.2	$x^2 + x = 12$ $\therefore x^2 + x - 12 = 0$ $\therefore (x+4)(x-3) = 0$ ✓**M** ✓**CA** $\therefore x = -4$ or $x = 3$	$(x+4)(x-3)$: 1 Mark Both solutions: 1 Mark	(2)
2.4.3	$5^{x+2} = \frac{1}{25}$ $\therefore 5^{x+2} = 5^{-2}$ ✓**M** $\therefore x + 2 = -2$ $\therefore x = -4$ ✓**CA**	5^{-2}: 1 Mark Answer: 1 Mark	(2)
			[25]

QUESTION 3 [26]

Ques.	Solution	Mark allocation	Total
3.1			
3.1.1	<table><tr><td>Shape</td><td>1</td><td>2</td><td>3</td><td>4</td><td>…</td><td>25</td></tr><tr><td>Number of rectangles</td><td>5</td><td>9</td><td>13</td><td>17</td><td>…</td><td>101</td></tr></table> q = 17 and r = 25 ✓A	q = 17 and r = 25 : 1 Mark	(1)
3.1.2	$T_n = 4n+1$ ✓A ✓A	$4n$: 1 Mark $+1$: 1 Mark	(2)
3.1.3	$T_n = 4n+1$ $205 = 4n+1$ ✓SF $n = 51$ ∴ Shape number 51 has 205 rectangles. ✓CA	T_n =205 : 1 Mark Answer: 1 Mark	(2)
3.2.1	$T_n = n^2+1$ ✓A ✓A	n^2 : 1 Mark $+1$: 1 Mark	(2)
3.2.2	$T_n = n^2+1$ $T_{10} = (10)^2+1$ ✓SF $T_n = 101$ ✓CA	$SF(n=10)$: 1 Mark Answer: 1 Mark	(2)
3.3.1	$A = \frac{1}{2}x+2$ $A = \frac{1}{2}(-2)+2$ ✓SF $A = 1$ ✓CA	SF x = -2 : 1 Mark Answer: 1 Mark	(2)
3.3.2	$\frac{1}{2}(B)+2 = 4$ ✓SF $B = 4$ ✓CA	SF x = B : 1 Mark Answer: 1 Mark	(2)

Ques.	Solution	Mark allocation	Total
3.4.1	Common difference = $-7-(-10)=3$ $y-$intercept = -1 Since $x=0$ ✓A $y=3x-1$ ✓A OR $m=\frac{y_2-y_1}{x_2-x_1}$ $m=\frac{-7-(-10)}{-2-(-3)}$ $m=3$ ✓A $y=3x-1$ ✓A	Explanation: 1 Mark Answer: 1 Mark If ANSWER ONLY Full Marks OR m = 3: 1 Mark Answer: 1 Mark If ANSWER ONLY Full Marks	(2)
3.4.2	$y=3x-1$ $8=3q-1$ ✓SF $q=3$ ✓CA	SF both values: 1 Mark Answer: 1 Mark	(2)
3.5.1	$y=-x+3$ $0=-x+3$ $x=3$ ✓A	Answer: 1 Mark	(1)
3.5.2		$y=-x+3$ $x-$intercept: 1 Mark $y-$intercept: 1 Mark Straight Line : 1Mark	(3)

Ques.	Solution	Mark allocation	Total
3.6.1	Monday to Tuesday ✓A **OR** Saturday to Sunday ✓A	Answer: 1 Mark	(1)
3.6.2	15 packets of sweets sold ✓A **OR** 10 packets of sweets sold ✓A	Answer: 1 Mark	(1)
3.6.3	Thursday to Saturday ✓A	Answer: 1 Mark	(1)
3.6.4	The decrease varied.✓A	Answer: 1 Mark	(1)
3.6.5	The sales were constant.✓A **OR** No increase or decrease in the sales.✓A	Answer: 1 Mark	(1)
			[26]

QUESTION 4 [12]

Ques.	Solution	Mark allocation	Total
4.1	$SI = P.i.n$ ✓M $720 = 1800.i.5$ ✓SF $i = \frac{720}{1800\times 5}$ $r = \frac{720}{1800\times 5}\times 100$ $r = 8\%$ ✓CA	Formula: 1 Mark Substitution: 1 Mark Answer: 1 Mark	(3)
4.2	Let the breadth of the original playground $= x$ $\therefore$ The length of the original playground $= x+1$ $\therefore$ The perimeter of the original playground $= 2(x+1+x)$ ✓M $= 4x+2$ ✓M The length of the new playground $= x+4$ The breadth of the new playground $= x-1$ $\therefore$ The perimeter of the new playground $= 2(x+4+x-1)$ ✓M $= 4x+6$ ✓M $\therefore$ The difference in perimeter $= 4x+6-(4x+2)$ $= 4 meters$ ✓CA	$2(x+1+x)$: 1 Mark $4x+2$: 1 Mark $2(x+4+x-1)$: 1 Mark $4x+6$: 1 Mark Answer: 1 Mark	(5)
4.3	Total distance travelled $= 210 km$ Total time travelled $= 2,5 hours$ ✓M Average Speed $= \frac{Distance}{Time}$ ✓M $= \frac{210 km}{2,5 hours}$ ✓SF $= 84 km/h$ ✓CA	Distance & Time: 1 Mark *Formula*: 1 Mark *Substitution*: 1 Mark Answer: 1 Mark	(4)
			[12]

QUESTION 5 [19]

Ques.	Solution	Mark allocation	Tot
5.1			
5.1.1	$x = 85^\circ$ (Alternate $\angle's$; AC//HF) ✓A ✓R	Answer: 1 Mark Reason: 1 Mark	(2)
5.1.2	$y = 95^\circ$ (Co-interior $\angle's = 180^\circ$; BF//CD) ✓A ✓R	Answer: 1 Mark Reason: 1 Mark	(2)
5.2			
5.2.1	$\angle Q_1 = 55^\circ$ (Corresponding $\angle's$; MN//QP) ✓S/ R $55^\circ + 2x - 5^\circ + 3x + 40^\circ = 180^\circ$ (3 $\angle's$ of $\Delta PQO = 180^\circ$) ✓S ✓R $5x + 90^\circ = 180^\circ$ $x = 18^\circ$ ✓CA	Statement and reason: 1 Mark Statement: 1 Mark Reason: 1 Mark Answer: 1 Mark	(4)
5.2.2	$\angle MON = 2x - 5^\circ$ $= 2(18^\circ) - 5^\circ$ ✓M $= 31^\circ$ ✓CA	Substitution/Method:1 Mark Answer: 1 Mark	(2)
5.3.1	$\angle ADB + \angle ABD = 110^\circ$[3 $\angle$'s of ΔABD=180°] ✓S/R But $\angle ADB = \angle ABD$[ΔADB is isosceles with AD = AB] ✓S/R $\therefore\ \angle ADB = 55^\circ$ ✓A	Statement and reason:1 Mark Statement and reason:1 Mark Answer: 1 Mark	(3)
5.3.2	✓S $\angle BDC = 55^\circ$[Diagonal of rhombus ABCD bisect $\angle$'s] ✓R $\therefore \angle ADC = 110^\circ$ ✓A **OR** ✓S $\angle DAE + \angle ADC = 180^\circ$[Co-interior $\angle$'s $= 180^\circ$; DC//AE] ✓R $\therefore 70^\circ + \angle ADC = 180^\circ$[Co-interior $\angle$'s $= 180^\circ$; DC//AE] $\therefore \angle ADC = 110^\circ$ ✓A	Statement :1 Mark Reason:1 Mark Answer: 1 Mark **OR** Statement :1 Mark Reason:1 Mark Answer: 1 Mark	(3)
5.3.3	✓S $\angle DBE = 125^\circ$[Exterior $\angle$ of ΔABD] ✓R	Statement :1 Mark Reason:1 Mark	(2)
5.3.4	The opposite side of a rhombus are parallel. ✓R OR DC//AE ✓R	Reason:1 Mark	(1)
			[19]

QUESTION 6 [12]

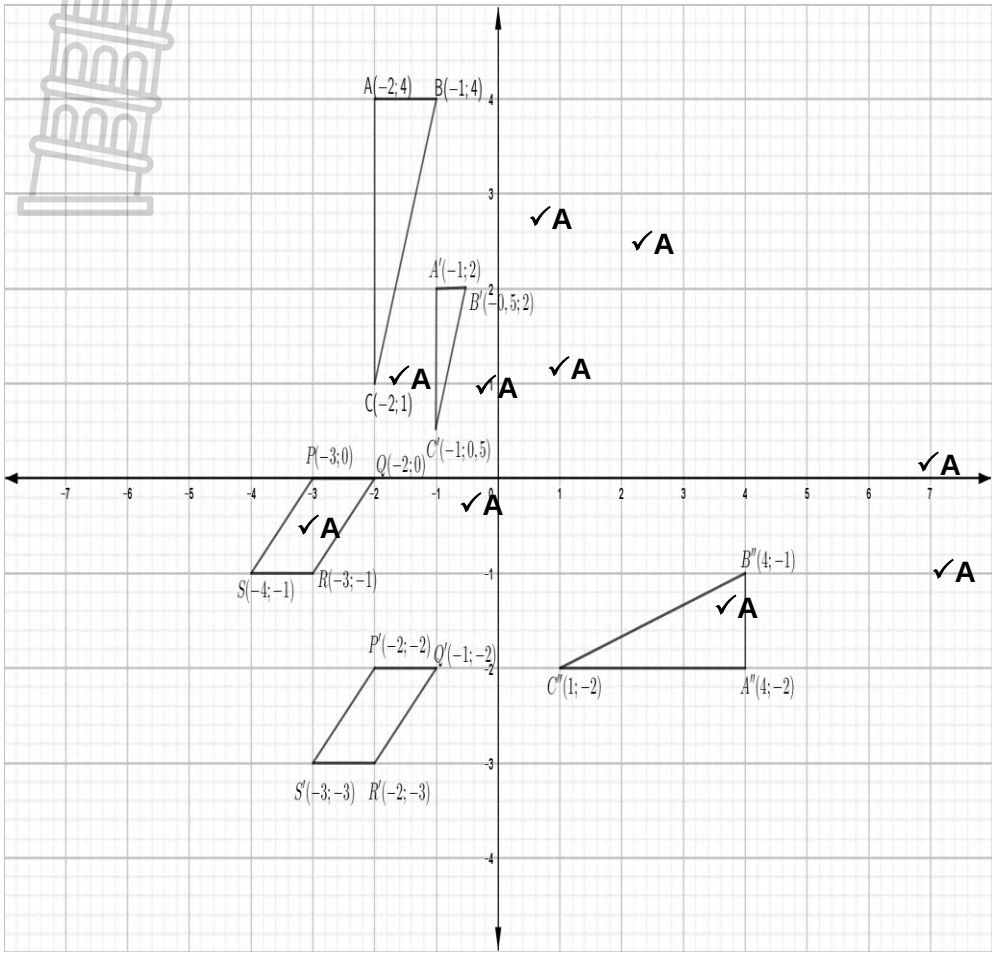
Ques.	Solution	Mark allocation	Total
6.1	In ΔPMN and ΔNOP: 1. $\angle MPN = \angle PNO$ [Alternate $\angle$'s; MP //NO] ✓S/R 2. $\angle MNP = \angle NPO$ [Alternate $\angle$'s; MN //PO] ✓S/R 3. PN=PN [Common] ✓S/R $\therefore \Delta PMN \equiv \Delta NOP[\angle\angle S]$ ✓S/R $\therefore$ PM = NO ✓S/R	Statement and reason: 1 Mark Statement and reason: 1 Mark Statement and reason: 1 Mark Statement and reason: 1 Mark Statement and reason: 1 Mark	(5)
6.2.1	In ΔDBE and ΔFCE: 1. $\angle E_1 = \angle E_3$ [Vertically Opposite $\angle$'s] ✓S/R 2. $\angle D_1 = \angle F$ [Alternate $\angle$'s; AB//CF] ✓S/R 3. $\angle B = \angle C_2$ [Alternate $\angle$'s; AB//CF] ✓S/R $\therefore \Delta DBE$ lll $\Delta FCE[\angle\angle\angle]$ ✓S/R **Note:** The learner can use any 2 pairs of equal angles in his/her proof and then simply state that the last pair of corresponding angles are equal because the sum of 3 angles of a triangle is equal to 180˚.	Statement and reason: 1 Mark Statement and reason: 1 Mark Statement and reason: 1 Mark Statement and reason: 1 Mark	(4)
6.2.2	$\frac{DB}{FC} = \frac{BE}{CE}$ [ΔDBE lll ΔFCE] ✓S/R $\frac{DB}{5} = \frac{8}{10}$ ✓SF $DB = 4cm$ ✓CA	Statement and reason: 1 Mark Substitution: 1 Mark Answer: 1 Mark	(3)
			[12]

QUESTION 7 [13]

Ques.	Solution	Mark allocation	Total
7.1.1	Total Surface Area of pipe closed $= 2\pi r^2 + 2\pi r \times h$ $= 2\pi(18)^2 + 2\pi(18) \times 120$ ✓SF $= 15607,4323cm^2$ ✓CA Total Surface Area of circular ends $= 2\pi r^2$ $= 2\pi(15)^2$ $= 1413,716694cm^2$ ✓A Total Surface Area of pipe open both sides $= 15607,4323cm^2 - 1413,716694cm^2$ $= 14193,72cm^2$ ✓CA	Substitution: 1 Mark $25000,79434cm^2$:1 Mark $2513,274123cm^2$:1 Mark Answer: 1 Mark	(4)

Ques.	Solution	Mark allocation	Total
7.1.2	Total Volume of pipe closed $= \pi r^2 \times h$ $= \pi (18)^2 \times 120$ ✓**SF** $= 122145,1224 cm^3$ ✓**CA** Total Volume of hole $= \pi r^2 \times h$ $= \pi (15)^2 \times 120$ $= 84823,00165 cm^3$ ✓**A** Total Volume of pipe (open on both sides) $= 122145,1224 cm^3 - 84823,00165 cm^3$ $= 37322,12 cm^3$ ✓**CA**	Substitution: 1 Mark $122145,1224 cm^3$: 1 Mark $84823,00165 cm^3$: 1 Mark Answer: 1 Mark	(4)
7.2	$FC = \sqrt{5^2 - 4^2}$ [Theorem of Pythagoras] $FC = 3cm$ ✓**A** Area of $\Delta ABC = \frac{1}{2} \times 6cm \times 4cm$ $= 12 cm^2$ ✓**CA** Area of square ACDE $= 6cm \times 6cm$ $= 36\ cm^2$ ✓**CA** Area of Circle $= \pi \times (3cm)^2$ $= 28,27433388\ cm^2$ ✓**CA** Area of ALL the shaded sections $= 12\ cm^2 + (36 cm^2 - 28,27433388 cm^2)$ $= 19,73\ cm^2$ ✓**CA**	$FC = 3cm$: 1 Mark $12 cm^2$: 1 Mark $36\ cm^2$: 1 Mark $28,27433388\ cm^2$: 1 Mark Answer: 1 Mark	(5)
			[13]

QUESTION 8 [10]

Ques.	Solution	Mark allocation	Tot.
8.1 and 8.2 and 8.3		8.1 $A^{l}(-1;2)$: 1 Mark $B^{l}(-0,5;2)$: 1 Mark $C^{l}(-1;0,5)$: 1 Mark	(3)
		8.2 $A^{ll}(4;-2)$: 1 Mark $B^{ll}(4;-1)$: 1 Mark $C^{ll}(1;-2)$: 1 Mark	(3)
		8.3 $P(-3;0)$: 1 Mark $Q(-2;0)$: 1 Mark $R(-3;-1)$: 1 Mark $S(-4;-1)$: 1 Mark	(4)
			[10]

QUESTION 9 [13]			
Ques.	**Solution**	**Mark allocation**	**Total**
9.1.1	a = 19 ✓**A** b = 90 ✓**A** c = 61	Value of a: 1 Mark Value of b and c: 1 Mark	(2)
9.1.2 a)	$P(\text{Girl}) = \frac{150}{250} / \frac{3}{5}$ ✓**A** ✓**A**	Numerator: 1 Mark Denominator: 1 Mark	(2)
9.1.2 b)	$P(\text{A boy owning a cell phone}) = \frac{76}{250} / \frac{38}{125}$ ✓**A** ✓**A**	Numerator: 1 Mark Denominator: 1 Mark	(2)
9.1.2 c)	$P(\text{A learner with no cell phone}) = \frac{61}{250}$ ✓**A** ✓**A**	Answer: 1 Mark	(2)
9.2.1	The mean tends to be shifted upwards if there are extreme values. ✓**S** In this case, there are a few higher salaries, so the mean is shifted upwards, ✓**R** while the median shows that half of the salaries will be below R5 225. ✓**R**	Statement: 1 Mark Reason: 1 Mark Reason: 1 Mark **Accept any other logical explanation.**	(3)
9.2.2	✓**A** The median is generally a better indicator of the real situation when the data is not evenly spread out. ✓**R**	The median: 1 Mark Reason: 1 Mark **Accept any other logical explanation.**	(2)
			[13]
		TOTAL:	**140**