Province of the
EASTERN CAPE
EDUCATION

SENIOR PHASE

GRADE 9

NOVEMBER 2017

MATHEMATICS

MARKS: **140**

TIME: **$2^1/_2$ HOURS**

9MATHS

This question paper consists of 17 pages including 2 annexures

INSTRUCTIONS AND INFORMATION

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

QUESTION 1

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
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 rational?

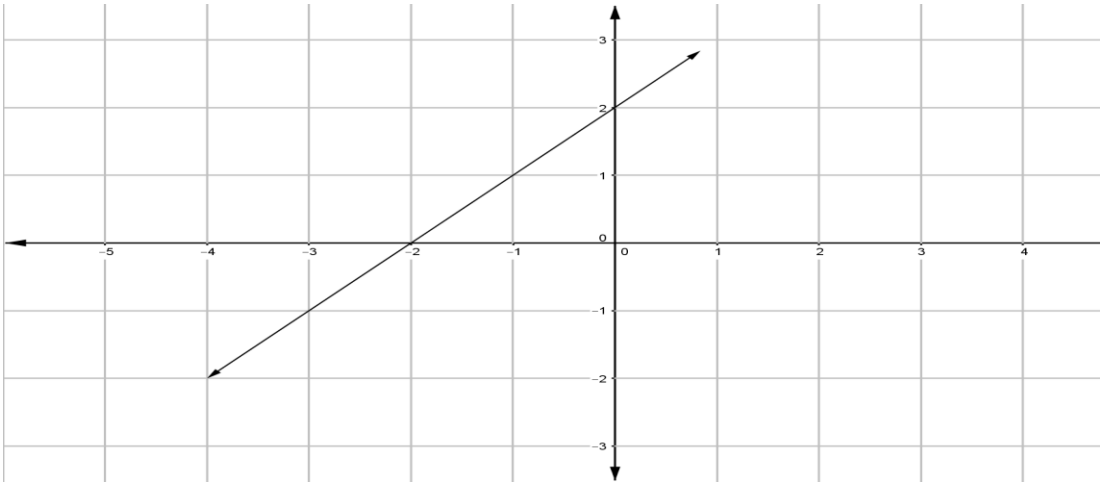
A $2,\dot{3}$

B $\sqrt{-16}$

C π

D $\sqrt[3]{53}$ (1)

1.2 The gradient of the straight line drawn below is:



A -2

B 2

C -1

D 1 (1)

1.3 The general rule (T_n) for the pattern 3 ; 7 ; 11 ; 15 is:

A $T_n = -4n+1$

B $T_n = 4n+1$

C $T_n = 4n-1$

D $T_n = -4n+1$ (1)

1.4 When $\frac{12m^2n-6mn^2}{3mn}$ is simplified, the answer is:

A $4m-2n$

B $2m^2n^2$

C $\frac{2m-n}{3}$

D $\frac{2m}{-n}$ (1)

1.5 If $\frac{2x-4}{3}-\frac{x}{4}=-1$, then the value of x is:

A $\frac{5}{8}$

B $\frac{4}{5}$

C $-\frac{5}{8}$

D $-\frac{4}{5}$ (1)

1.6 The following table shows the number of days a certain number of men will take to complete a task.

Number of men	1	5	10	15
Time taken in hours	20	4	x	$\frac{4}{3}$

The value of *x* is:

A 200

B 2

C $\frac{4}{5}$

D 8 (1)

1.7 Pairs of socks are neatly packed in a drawer of a wardrobe. There are 4 pairs of black socks, 2 pairs of blue socks, 3 pairs of yellow socks and 5 pairs of white socks.
One pair of socks is taken from the drawer without looking. What is the probability of not taking a pair of white socks?

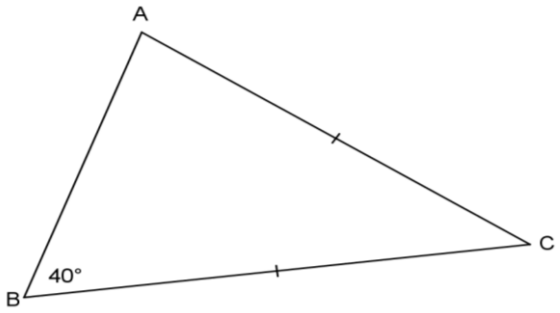
A 5

B $\frac{5}{14}$

C $\frac{9}{14}$

D $\frac{5}{9}$ (1)

1.8 In ΔABC the size of $\angle C$ is:



A 40°

B 180°

C 60°

D 100° (1)

1.9 The value (in scientific notation) of $3,7\times10^{-7}\times2\times10^{4}$ is:

A $0,74 \times 10^{3}$

B $7,4 \times 10^{-3}$

C $7,4 \times 10^{3}$

D 74×10^{-3} (1)

1.10 The surface area of an open top cylinder, with a height of 97 cm and the circumference of its base measuring 85,9 cm, if it is expressed to 2 decimal places, it will be:

A 8 919,49 cm^2

B 8 919,49 cm^3

C 9 506,67 cm^2

D 9 506,67 cm^3

(1)
[10]

QUESTION 2

2.1 Write 0,000 014 6 in scientific notation. (1)

2.2 Simplify:

2.2.1 $\sqrt{0,06y^4+0,1y^4}$ (2)

2.2.2 $\dfrac{\sqrt[3]{x^6}}{(4x^2)^0}$ (2)

2.2.3 $\dfrac{(3x^4y^{-1})^2}{x^{-2}\times x^{-1}y^{-2}}$ (3)

2.2.4 $3(x-3)(x+3)-(x-1)^2$ (4)

2.2.5 $3\frac{1}{4}x-2\frac{2}{3}\times 2\frac{1}{6}x+4\frac{1}{2}x$ (4)

2.3 Factorise completely.

2.3.1 $2x^2+6x-36$ (3)

2.3.2 $9x(5a-b)+2(b-5a)$ (3)

2.4 Solve for x:

2.4.1 $(2x-3)(2x+3)=0$ (2)

2.4.2 $\dfrac{3x-2}{7}=\dfrac{x-2}{3}$ (3)

2.4.3 $27.3^x=1$ (3)
[30]

QUESTION 3

3.1 Study the geometric pattern below and answer the questions that follow:

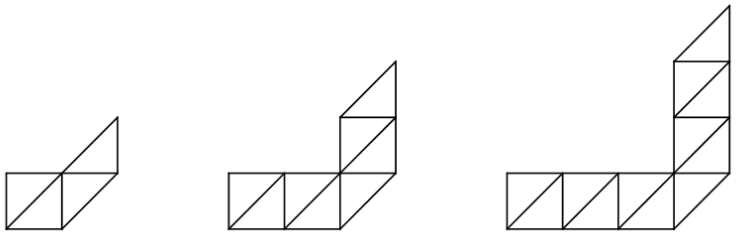


Figure 1 Figure 2 Figure 3

3.1.1 Refer to the table below and write down the value of *p* and *q*

Figure	1	2	3	4
Number of Triangles	4	8	p	q

(1)

3.1.2 Determine the general rule (T_n) of the pattern. (1)

3.1.3 Use the rule obtained in **question 3.1.2** to determine which figure will have 120 triangles. (3)

3.2 A straight line graph is defined by $y = 2x - 4$

3.2.1 Determine the X - intercept of the graph. (2)

3.2.2 Determine the Y - intercept of the graph. (1)

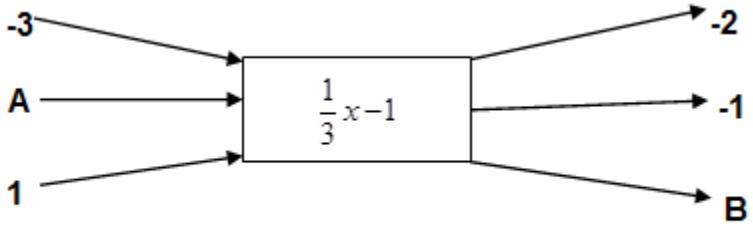
3.2.3 Draw the graph showing all your intercepts with the axes. Use ANNEXURE 1. (3)

3.3 On the same system of axes (use ANNEXURE 1) to draw the graph of $x = 4$. (2)

3.4 Find the value of y when the graphs of $y = 2x - 4$ and $x = 4$ intersect. (1)

3.5 Read the flow diagram below and answer the questions that follow:

Input values *x*
Output values *y*



3.5.1 What is the input value in **A**? (2)

3.5.2 What is the output value in **B**? (2)

3.6 Use the table below to answer the questions that follow:

x	–1	0	1	2	…..	m
y	–5	–3	–1	1	…..	21

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

3.6.2 Determine the value of m. (2)
[22]

QUESTION 4

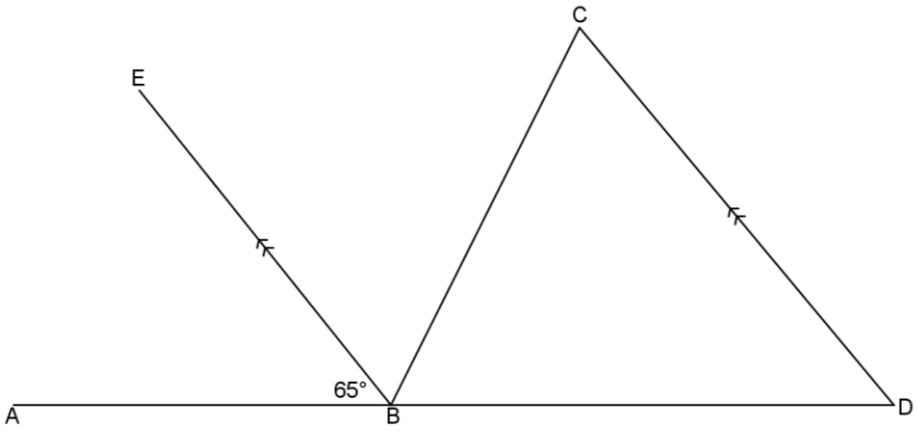
4.1 Craig invests $R15\ 000$ for 3 years at 16% per annum compound interest. Calculate the interest he receives after 3 years. (3)

4.2 The combined ages of a father and his son are 36. In seven years' time the father will be four times as old as his son. Find their current ages. (5)

4.3 A certain distance is covered in 3 hours at an average speed of $120km/h$. How long will it take to cover the same distance at an average speed of $90km/h$? (4)
[12]

QUESTION 5

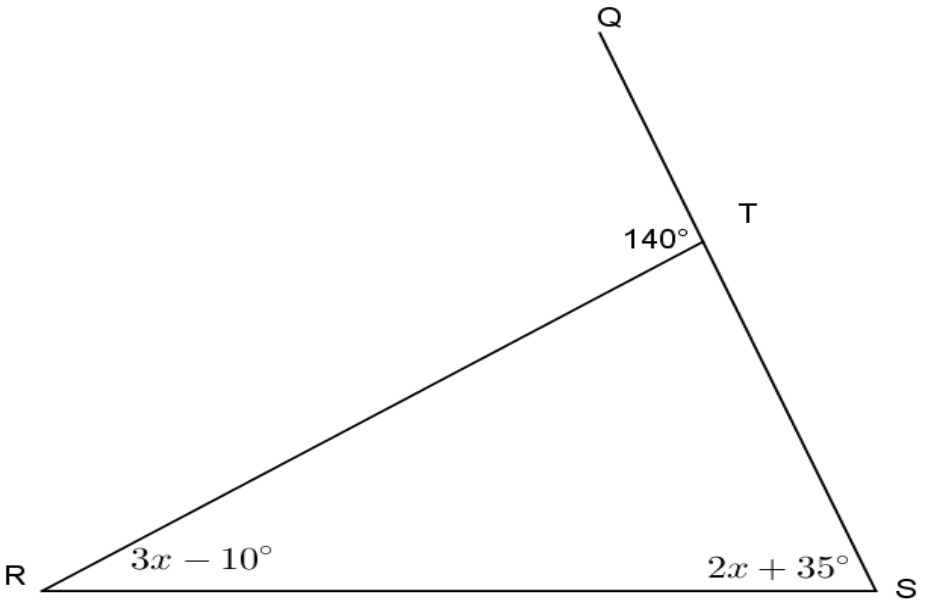
5.1 In the diagram $\angle ABE = 65^\circ$. EB∥CD and $\angle ABE = \angle EBC$. Find with reasons, the size of:



5.1.1 $\angle ADC$ (2)

5.1.2 $\angle BCD$ (2)

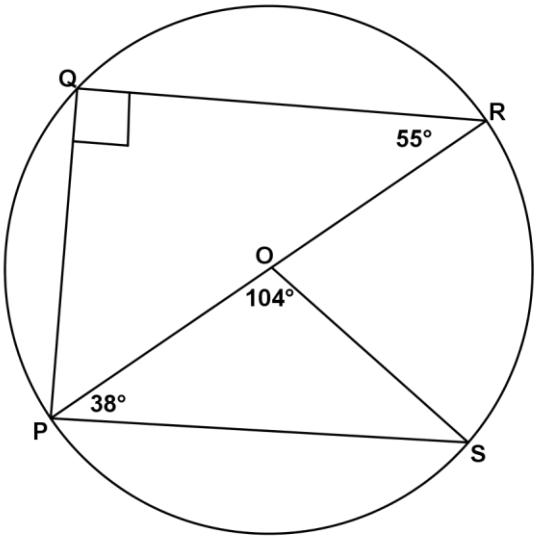
5.2 In the diagram below, $\angle QTR = 140^\circ$, $\angle QSR = 2x + 35^\circ$ and $\angle TRS = 3x - 10^\circ$.



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

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

5.3 In the figure below, O is the centre of the circle. $\angle OPS = 38^\circ, \angle POS = 104^\circ \text{ and } \angle PRQ = 55^\circ.$



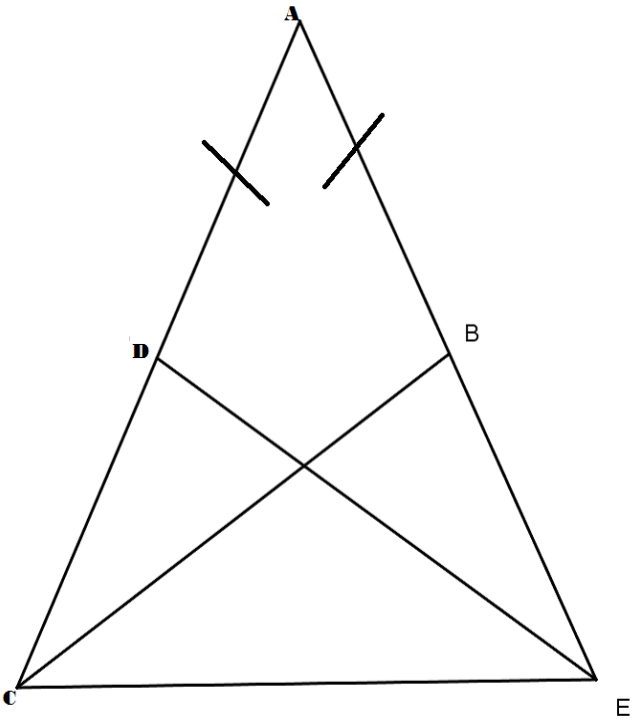
5.3.1 Calculate the size of $\angle QPR$. Give a reason for your answer. (2)

5.3.2 Calculate the size of $\angle PSO$. Give a reason for your answer. (2)

[14]

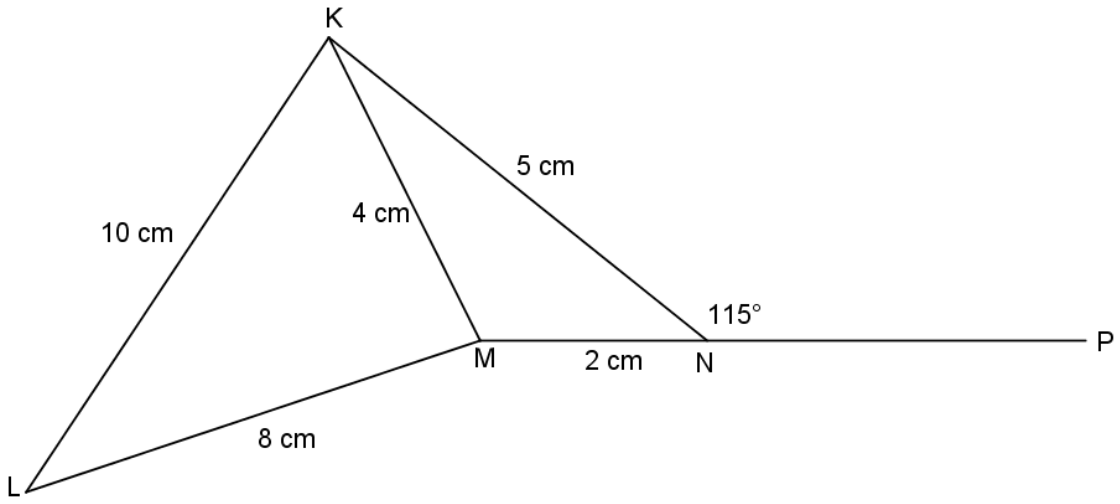
QUESTION 6

6.1 In the figure, $AD = AB$ and $CD = BE$. Prove that $\Delta ABC \equiv \Delta ADE$.



. (4)

6.2 KN = 5 cm, MN = 2 cm, KM = 4 cm, LM = 8 cm and KL = 10 cm.



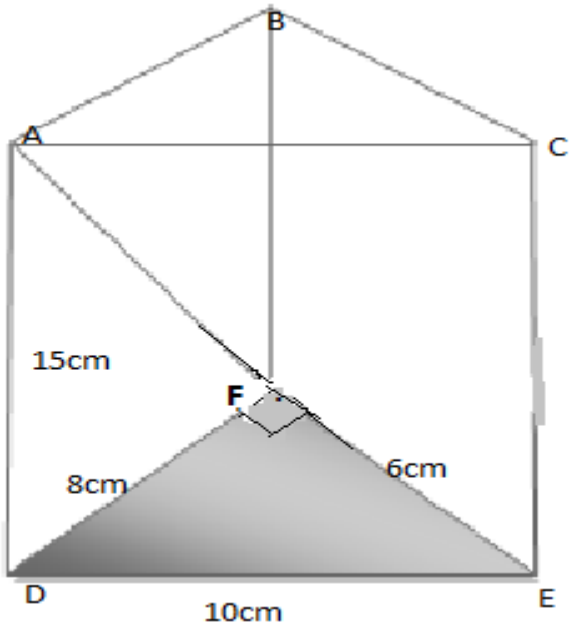
6.2.1 Prove that $\Delta MNK \,|||\, \Delta MKL$ (4)

6.2.2 Calculate the actual size of $\angle LKM$ if it is given that MNP is a straight line. Give a reason for your answer. (3)

[11]

QUESTION 7

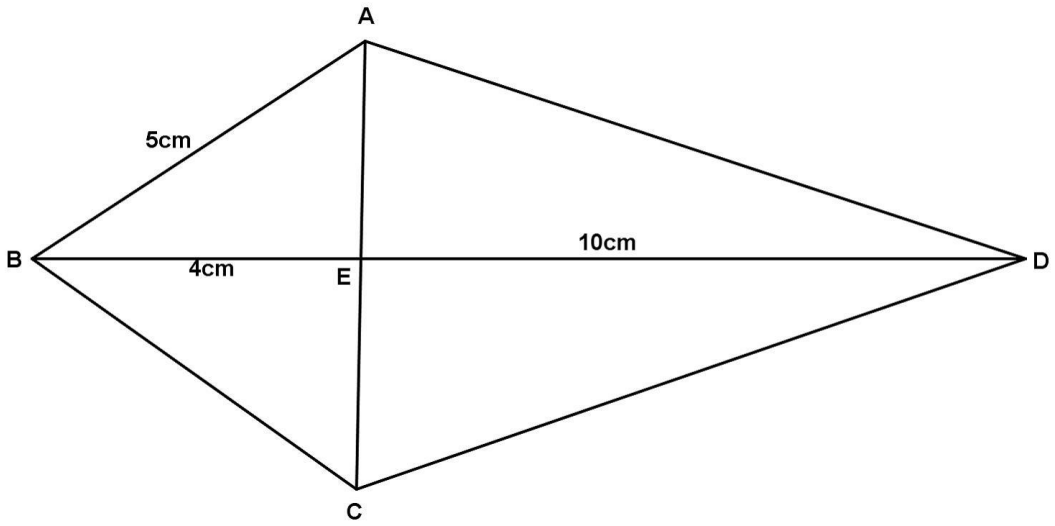
7.1 A triangular prism is shown in the figure below. The base is a right-angled triangle with DF= 8 cm, DE= 10 cm FE= 6 cm, and the height 15 cm.



7.1.1 Calculate the surface area of the triangular prism. (2)

7.1.2 Calculate the volume of the triangular prism. (3)

7.2 A diagram of a kite, ABCD with AB = 5 cm, BE = 4cm, and DE = 10 cm, is given below.



7.2.1 Calculate the length of AE. (2)

7.2.2 Calculate, with a reason, the length of the diagonal AC. (2)

7.2.3 Find the area of quadrilateral PQRD which is $\frac{3}{2}$ of the area of kite ABCD. (3)

7.3 A cylinder has a height of 10cm and the circumference of the base is 44cm.

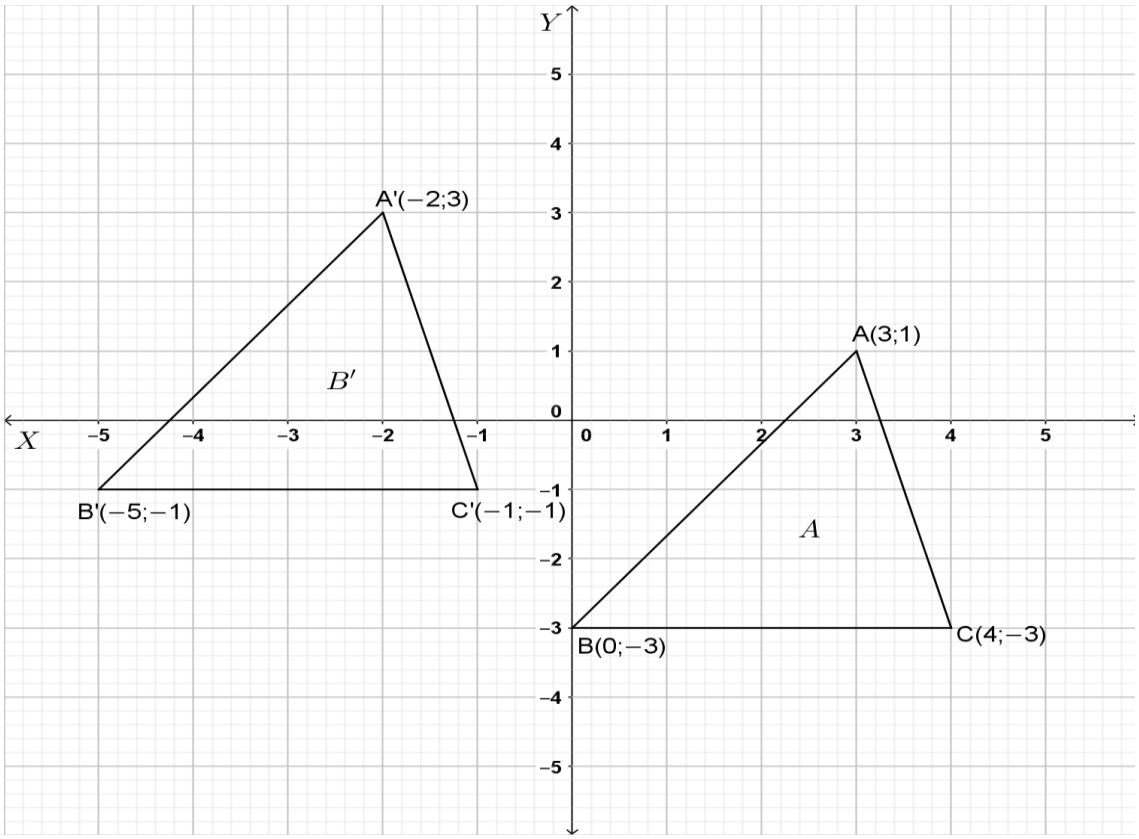
7.3.1 Calculate, correct to the nearest whole number, the radius of the base. (3)

7.3.2 Hence, calculate(correct to TWO decimal digits) the volume of the cylinder. (3)

[18]

QUESTION 8

8.1 Study the diagram given below and answer the questions based on it.



8.1.1 State the rule of the transformation indicated above in the form $(x;y)\rightarrow(\ldots..;\ldots..)$ (2)

8.1.2 Enlarge ΔABC by a scale factor of 2 and give the coordinates of the vertices of $\Delta A^{/l}B^{/l}C^{/l}$. (3)

8.2 P$(-2\ ;\ 2)$, Q$(-2;-2)$, and R$(-3;-2)$ are the vertices of ΔPQR.

8.2.1 Plot the pointsP$(-2\ ;\ 2)$, Q$(-3\ ;\ -2)$, and R$(2\ ;\ 0)$ to form ΔPQR. (2)

8.2.2 Reflect ΔPQR in the line $y=x$ to form $\Delta P^{/}Q^{/}R^{/}$. (3)

[10]

QUESTION 9

9.1 There is a blue pencil, a red pencil, two green rulers and a white ruler on a desk. A pencil and a ruler is taken at random.

9.1.1 Draw a tree diagram to show all possible outcomes. (2)

9.1.2 What is the probability that a red pencil and a green ruler are taken? (1)

9.1.3 What is the probability that a white pencil and a red ruler are taken? (1)

9.2 The table shows the marks(in percentage) obtained by 12 learners in a Maths test and a Natural Science test.

Maths	15	40	50	62	65	68	70	75	80	85	88	90
Natural Science	90	45	52	70	65	70	65	80	75	90	80	40

9.2.1 Represent the data in a scatter plot. Use ANNEXURE 2. (3)

9.2.2 Identify ONE possible outlier. (1)

9.2.3 Compare the relationship between performance in Mathematics and Natural Science for the learners (1)

9.3 The following data represents the number of people who visited a farm stall during December over a 10 day period.

18 20 22 23 x 30 35 40 42 46

9.3.1 If the median of the data is 27, determine the value of x. (2)

9.3.2 Determine the mean of the data (2)

[13]

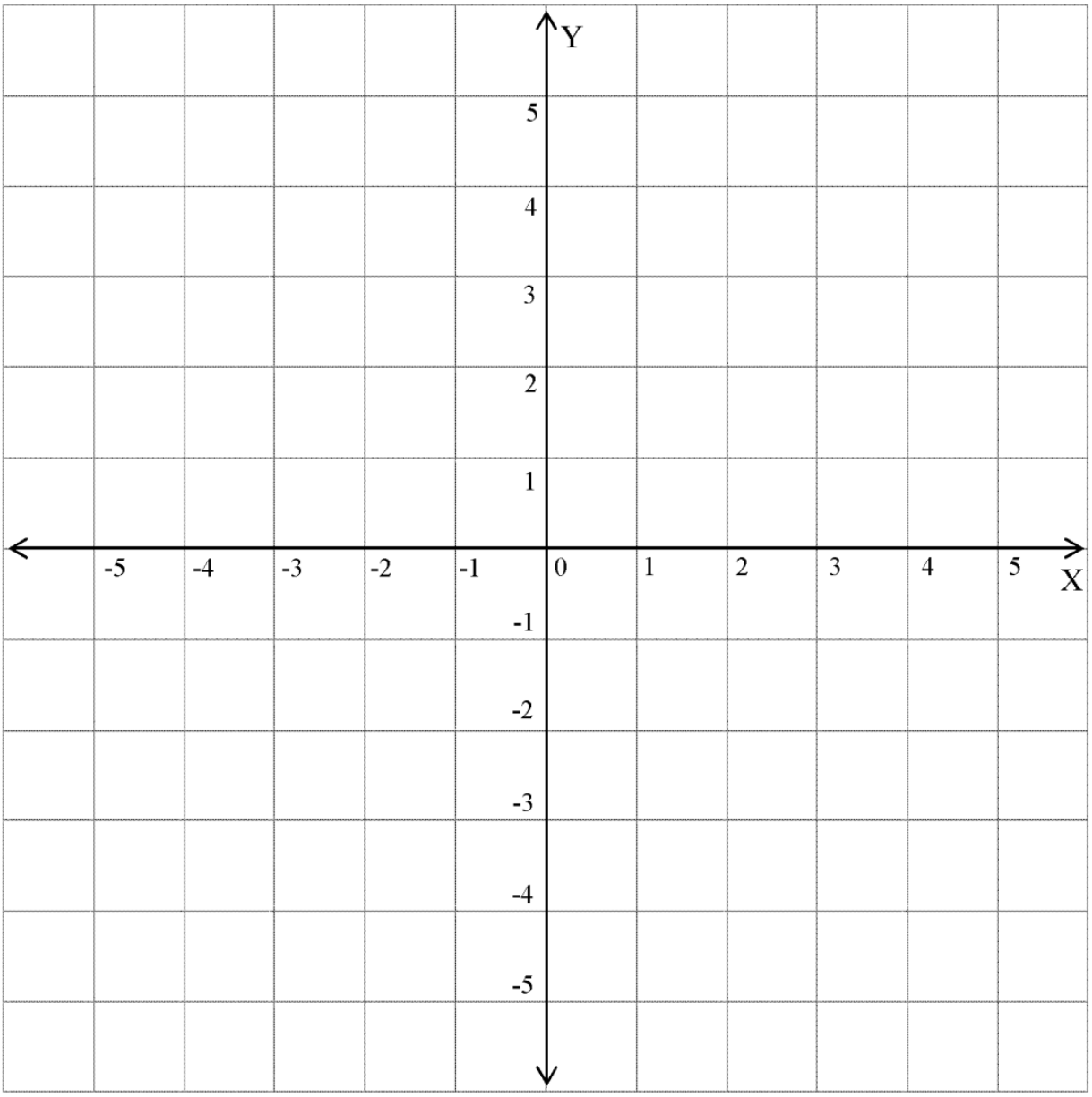
GRAND TOTAL: 140

ANNEXURE 1

QUESTION 3.2.3

NAME: _____

SURNAME: _____



ANNEXURE 2

QUESTION 9.2.1

NAME: _____

SURNAME: _____