



FOUNDED 1900

THE ENGLISH SCHOOL
A SECOND CENTURY OF EXCELLENCE

END-OF-YEAR-EXAMINATIONS

YEAR 2 MATHEMATICS MATHS FRAMEWORKING BOOKS 2.3 & 3.3

Time allowed: 2 hours

Instructions to candidates

In the boxes below write your name, surname and form.
Answer the questions in the spaces provided.
Without sufficient working, correct answers may be awarded no marks.
Do not write in the right hand margin.

Information to candidates

This paper has 25 questions.
There are 16 pages in this question paper.
Full marks may be obtained for answers to all questions.
The total marks for this paper is 120.
The marks for each question is shown in round brackets, e.g. (2)
Calculators may be used.

Advice for candidates

Write your answers neatly and in good English.
Work steadily through the paper.
Do not spend too long on one question.
Show all stages in any calculations.

Materials required for the paper

Calculator, ruler graduated in centimetres and millimetres, protractor, pair of compasses, pen, HB pencil, eraser. Tracing paper may be used.

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blank

1. Evaluate the following, without using a calculator:

(a) $5\frac{1}{5} - 2\frac{3}{4} =$

Answer: (2)

(b) $1\frac{2}{5} \div 4\frac{9}{10} =$

Answer: (2)

(Total 4 marks)

Q1

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2. Without a calculator, determine the following, giving your answers in standard form:

(a) $6.1 \times 10^{-3} + 9.3 \times 10^{-2}$

Answer: (2)

(b) $(1.4 \times 10^{-5}) \div (7 \times 10^{-11})$

Answer: (2)

(Total 4 marks)

Q2

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3. A shop sells three different sizes of the same chocolate. The shop is selling the 45 g for €0.73, the 70 g for €0.95 and the 100 g for €1.12. Which chocolate is the best value for money?

Answer: (2)
(Total 2 marks)

Q3

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4. A bag has only red and blue discs in it. The probability of picking red is $\frac{3}{7}$.
(a) What is the probability of picking a blue disc?

Answer: (1)

- (b) Javier picks out 4 red discs without replacing them. What is the smallest number of blue discs that could have been in the bag?

Answer: (1)

- (c) If Javier picks out a total of 7 red discs without replacing them, what is the smallest number of blue discs that could have been in the bag?

Answer: (2)
(Total 4 marks)

Q4

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5.

- (a) During the first 16 weeks of her life, a baby girl increases her mass from 3.05 kg to 5.85 kg. What percentage increase does this represent? Give your answer to one decimal place.

Answer: % (2)

- (b) In April, an airline company increases all its fares by 15%. In September of the same year it reduces all its fares by 10%. What is the net percentage increase in fares from April to September?

Answer: % (2)

- (c) The manager of a home store wants to check how much his supplier is charging him for a television before VAT is added. The price of the television including 19% VAT is €2499. Find the price before VAT is added.?

Answer: € (2)

(Total 6 marks)

Q5

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6. A can has a height of 92 mm and a capacity of 256 ml.
A similar can has a height of 115 mm. Calculate the capacity of the second bottle.

Answer: ml (3)

(Total 3 marks)

Q6

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7.

(a) Convert the scale 2 cm to 25 km to a map ratio in its simplest form.

Answer: (2)

The map shows a part of Europe. The map ratio is 1:6000000.



(b) Find the actual direct distance between London and Paris in kilometres.

Answer: km (2)

(c) The actual direct distance between Bristol and Brussels is 505 km. Calculate the direct distance on the map? Give your answer in centimetres correct to 1 decimal place.

Answer: cm (2)

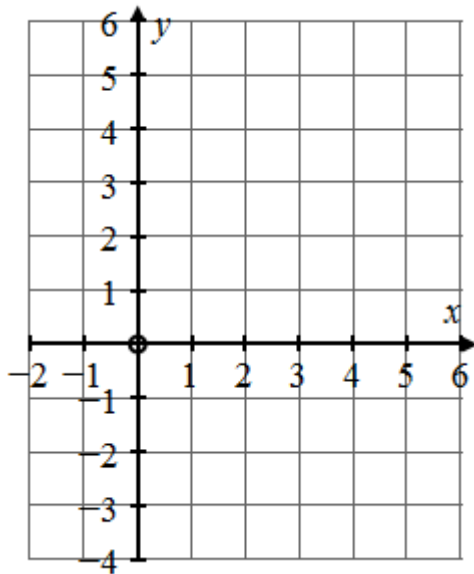
(Total 6 marks)

Q7

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8.

- (a) Find the equation of the line which passes through the points A $(-1, -3)$ and B $(3, 5)$ by plotting the points on the grid below.



Answer: (4)

- (b) Calculate the length of the line segment AB correct to 3 significant figures.

Answer: (2)

(Total 6 marks)

Q8

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9. Platinum has a density of 21.45 g/cm^3 . A cylinder made of platinum has height 15 cm and radius 2.5 cm. Find the mass of this piece of platinum in kilograms correct to two decimal places.

Answer: kg (4)

(Total 4 marks)

Q9

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10. In 2016, Nico Rosberg drove at an average speed of 137.2 mph during the qualifying session of the Russian Formula 1 grand prix race.

- (a) Given that the length of the circuit is 3.634 miles, how long did it take Rosberg to complete this? Give your answer in minutes and seconds, correct to the nearest second.

Answer: (3)

- (b) Given that 1 km is equivalent to 0.621371 miles, convert Rosberg's average speed to km/h. Give your answer to 1 decimal place.

Answer: (2)

(Total 5 marks)

Q10

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11. Simplify each of the following:

(a) $\frac{75w^4}{125w}$

Answer: (2)

(b) $\frac{16a + 48}{2a + 6}$

Answer: (2)

(Total 4 marks)

Q11

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12. Factorise the following expressions.

(a) $54a^2 - 9a$

Answer: (1)

(b) $x^2 - 12x + 35$

Answer: (2)

(c) $50y^2 - 8$

Answer: (2)

(Total 5 marks)

Q12

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13. Write each expression as a single fraction, as simply as possible.

(a) $\frac{3x+2}{7} - \frac{2}{5}$

Answer: (2)

(b) $\frac{w+5}{16} \div \frac{7}{4}$

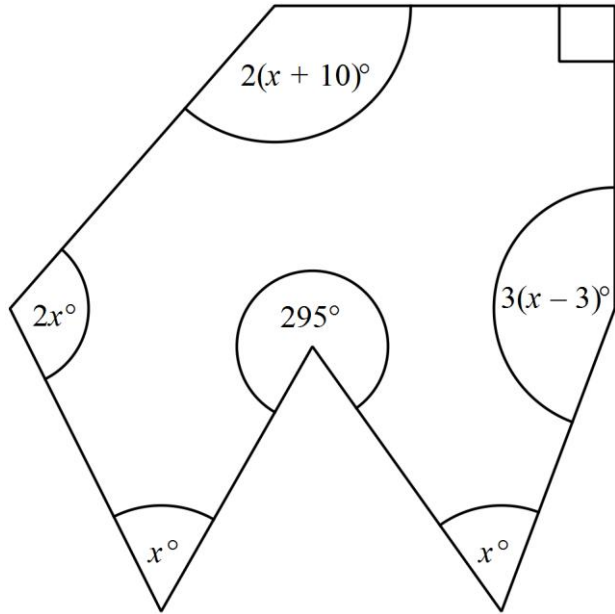
Answer: (2)

(Total 4 marks)

Q13

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14. Here is a polygon with seven sides.



(a) Is the polygon above convex or concave? Explain your answer.

.....
.....

(b) By forming a suitable equation and solving it, find the value of x .

(2)

Answer: (4)

(Total 6 marks)

Q14

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15. The formula $u^2 = v^2 - 2as$ is used in kinematics.
Make s the subject of this formula.

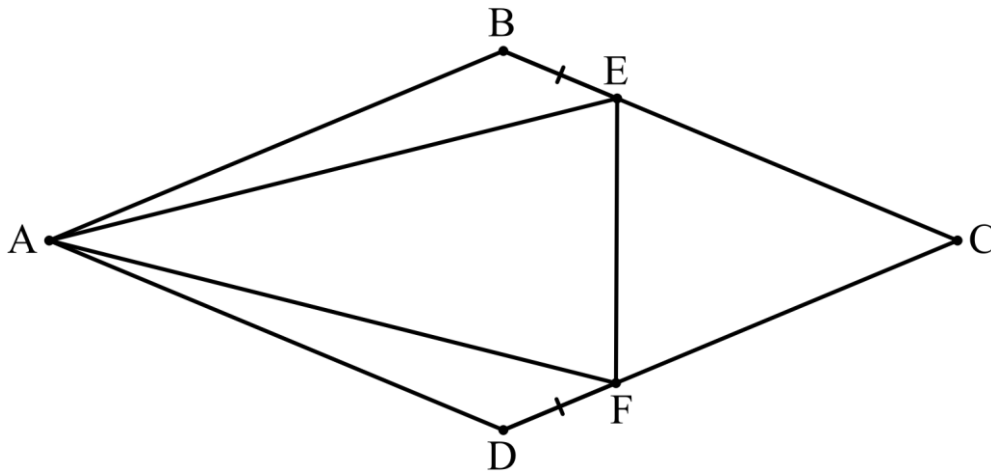
Answer: (2)

(Total 2 marks)

Q15

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16. In the diagram below, ABCD is a rhombus. $BE = DF$.



Prove that triangle ABE is congruent with triangle ADF.

Q16

(Total 4 marks)

17. A bottle of medicine holds 0.1 litres to the nearest millilitre.

- (a) What is the smallest possible amount in the bottle?
Give your answer in millilitres.

Answer: ml (1)

- (b) What is the greatest possible amount that ten bottles could hold? Give your answer to the nearest millilitre.

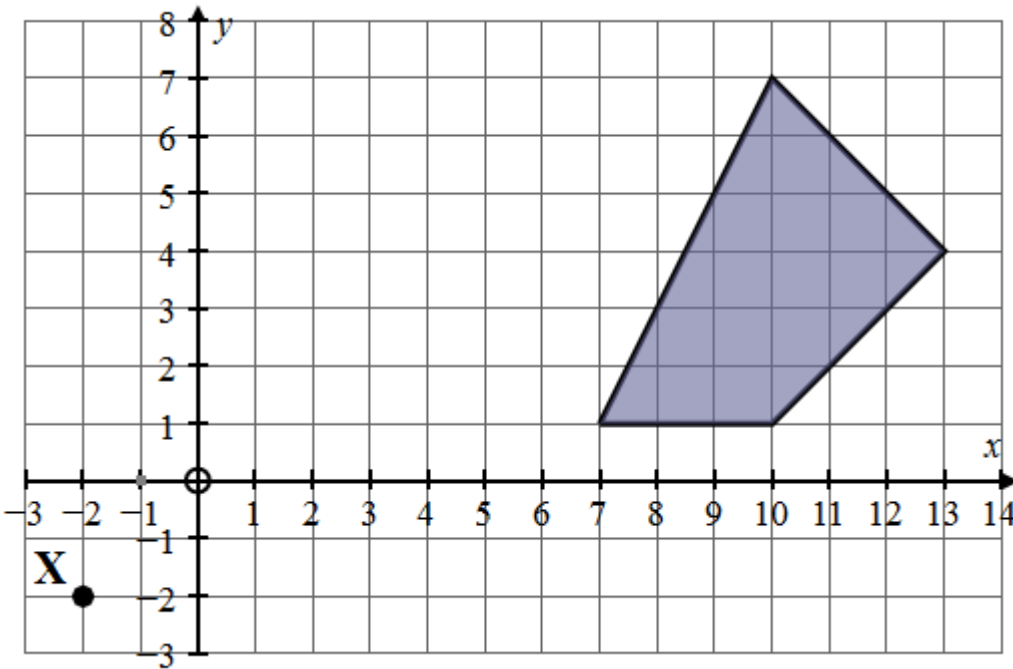
Answer: ml (2)

Q17

(Total 3 marks)

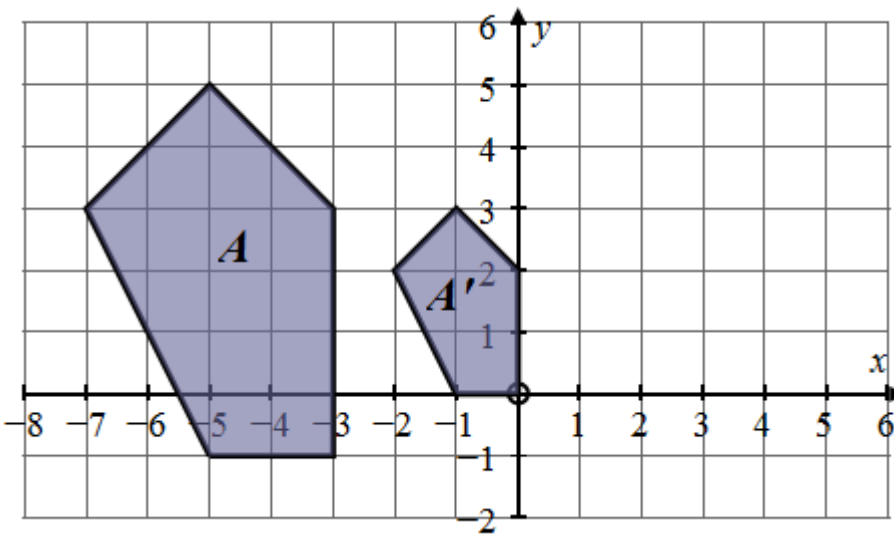
18.

(a) Enlarge the shape by a scale factor of $\frac{1}{3}$ about the point X.



(2)

In the grid below shape A' is an enlargement of shape A .



(b) What is the scale factor of the enlargement?

Answer: (1)

(c) Work out the coordinates of the centre of enlargement by drawing rays on the diagram.

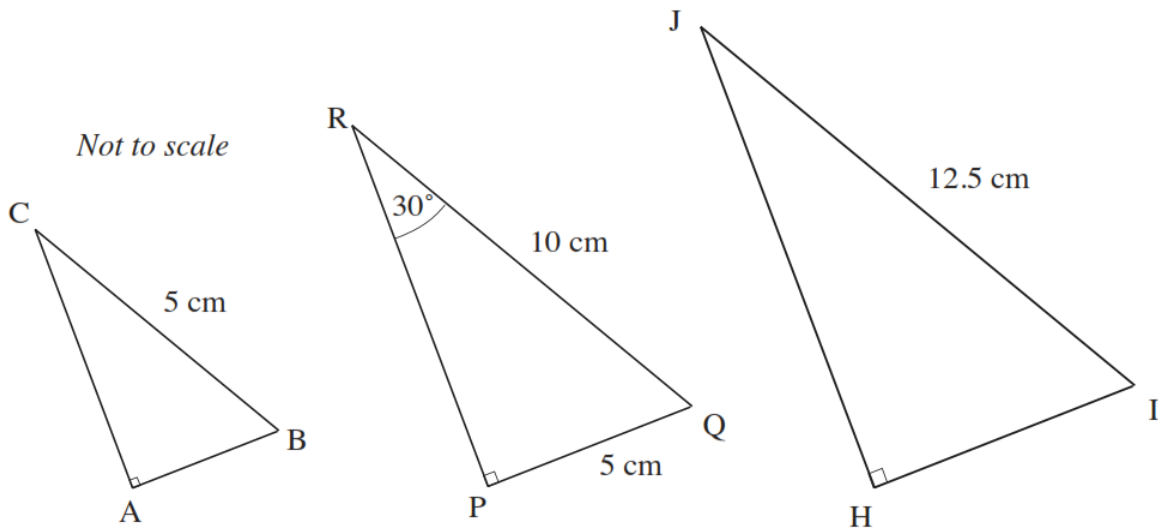
Answer: (.....,) (2)

(Total 5 marks)

Q18

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19. Triangles ABC, PQR and HIJ are all similar.



(a) Calculate the length of AB .

Answer: (2)

(b) What is the size of angle B ?

Answer: (1)

(c) Calculate the length of HJ correct to 3 significant figures.

Answer: (3)

(d) Express the area of the triangle HIJ to the area of the triangle ABC as a ratio in the form $n : 1$.

Answer: (1)

(Total 7 marks)

Q19

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20. Solve the following equations.

(a) $3(5x - 2) = 39$

Answer: (2)

(b) $\frac{2x}{2x-1} = \frac{3}{7}$

Answer: (3)

(c) $\frac{1}{4}(17 - 2a) = \frac{1}{2}(5 + 4a)$

Answer: (4)

(Total 9 marks)

Q20

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21. Expand the brackets and simplify the following expression as much as possible.

$2x(5xy - 3x + 5y) - 4(3x^2y + 2xy - 4x^2) =$

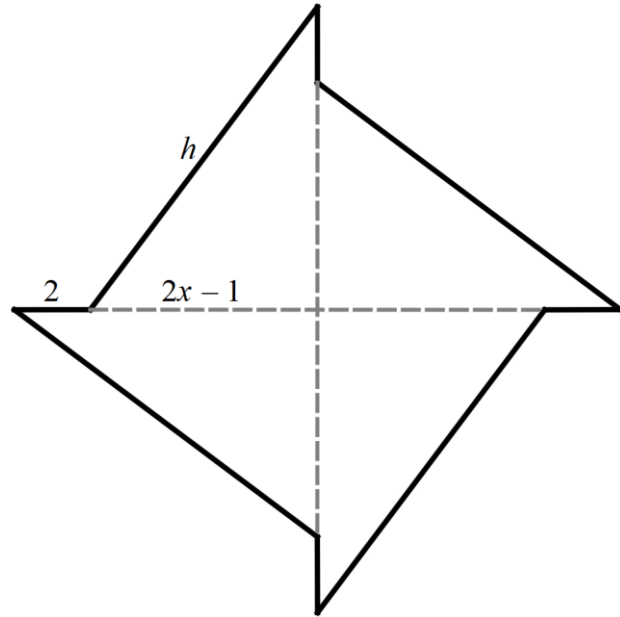
Answer: (4)

(Total 4 marks)

Q21

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22. Four congruent right angled triangles are placed together to form the shape shown below. One leg of the triangle has length $(2x - 1)$ cm and the other leg is 2 cm longer. The hypotenuse is h cm.



(a) Show that $h^2 = 8x^2 + 2$.

(4)

(b) Given that $h = 10$ cm, find the value of x .

Answer: (3)

(c) Find an expression in terms of x , for the total area of the shape.

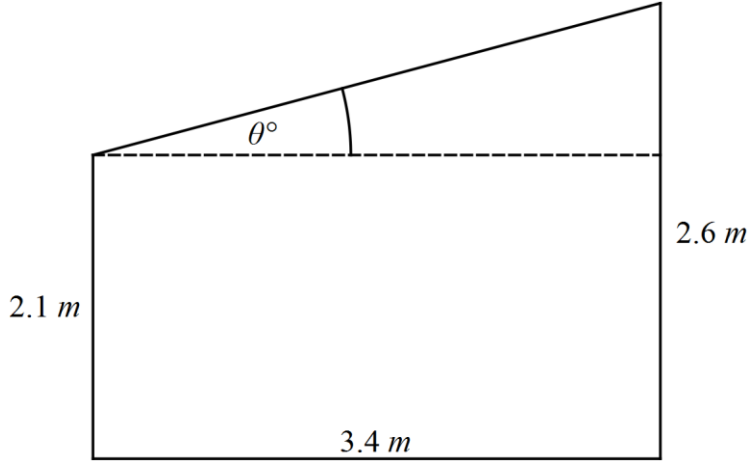
Answer: cm^2 (3)

(Total 10 marks)

Q22

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23. The diagram shows the cross-section of a shed.



Calculate the angle θ between the roof and the horizontal.
Give your answer to the nearest degree.

Answer: (3)

(Total 3 marks)

Q23

24. In the following table F is inversely proportional to v .

F	500	100	
v	3		30

- (a) Complete the table. (2)
- (b) Find the equation connecting F and v .

Answer: (2)

(Total 4 marks)

Q24

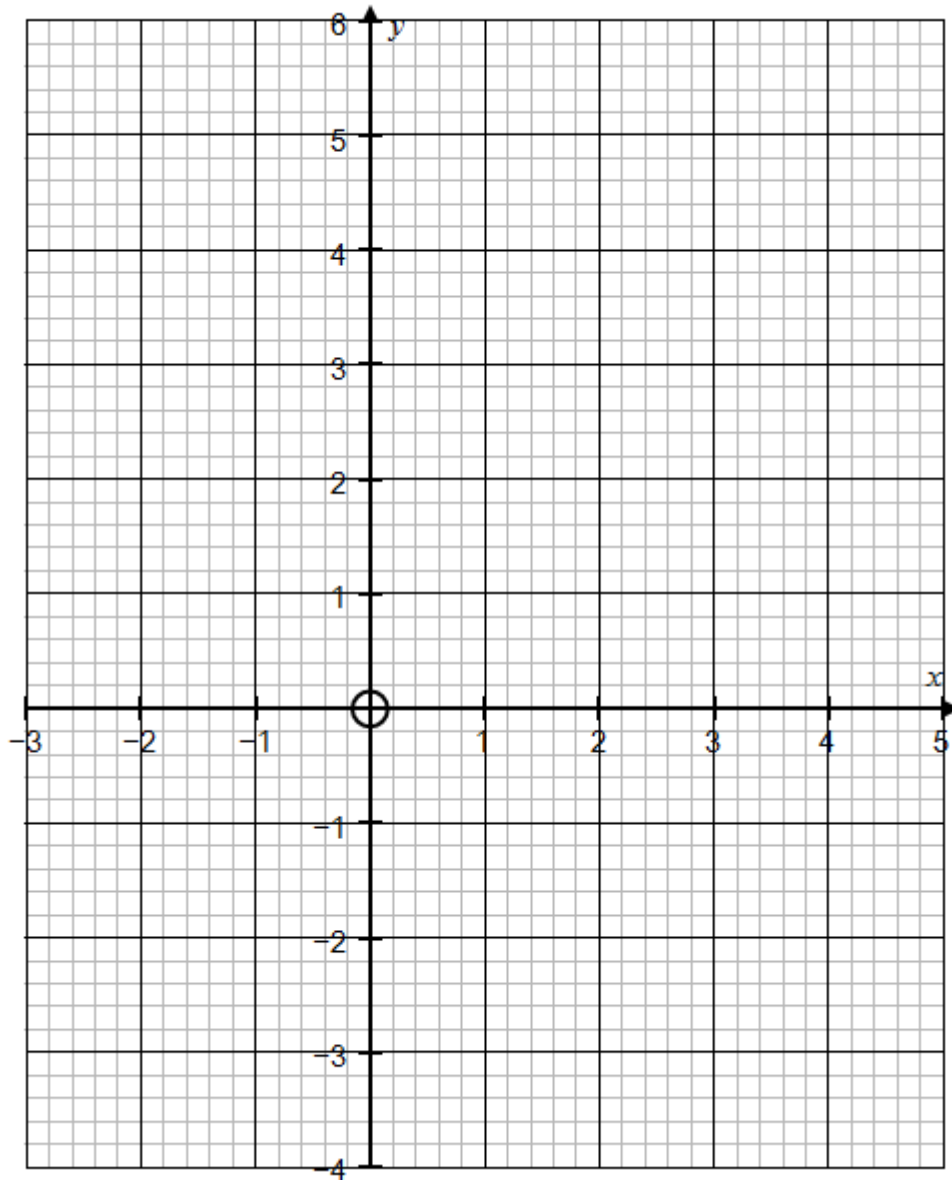
25.

(a) Complete the table for the equation $y = x^2 - 2x - 2$.

x	-2	-1	0	1	2	3	4
y		1			-2		

(2)

(b) Use the table to draw on the grid below, the graph of $y = x^2 - 2x - 2$.



(2)

(c) Use your graph to solve the equation $x^2 - 2x - 2 = 2$

Answer: (2)

END

(Total 6 marks)

Q25

TOTAL FOR PAPER: 120 MARKS