UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER			

4814804174

MATHEMATICS **0580/32**

Paper 3 (Core) **May/June 2010**

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
Mathematical tables (optional)
Geometrical instruments
Tracing paper (optional)

READ THESE INSTRUCTIONS FIRST

Write your Centre number, candidate number and name on all the work you hand in.
Write in dark blue or black pen.
You may use a pencil for any diagrams or graphs.
Do not use staples, paper clips, highlighters, glue or correction fluid.
DO **NOT** WRITE IN ANY BARCODES.

Answer **all** questions.
If working is needed for any question it must be shown below that question.
Electronic calculators should be used.
If the degree of accuracy is not specified in the question, and if the answer is not exact, give the answer to three significant figures. Give answers in degrees to one decimal place.
For π, use either your calculator value or 3.142.

At the end of the examination, fasten all your work securely together.
The number of marks is given in brackets [ ] at the end of each question or part question.
The total of the marks for this paper is 104.

This document consists of **15** printed pages and **1** blank page.

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1 **(a)** **(i)** 1, 2 and 36 are factors of 36.

Write down all the other factors of 36.

Answer(a)(i) ..... [2]

(ii) 1 and 2 are common factors of 36 and 90.

Write down two more common factors of 36 and 90.

Answer(a)(ii) ..... [2]

(b) Write down all the square numbers between 20 and 50.

Answer(b) ..... [3]

(c) p and q are prime numbers.

$$p^3 \times q = 56$$

Find p and q.

Answer(c) p = ...

q = ... [2]

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2 Francis earns \$150 per week.
He has \$132 left after he pays his tax.

(a) Calculate what percentage of his \$150 he pays in tax.

Answer(a) ..... % [3]

(b) He divides the \$132 between expenses, savings and family in the ratio

Expenses : Savings : Family = 15 : 7 : 11.

Calculate his expenses.

Answer(b) \$ ..... [3]

(c) His rent is \$24 per week.

What fraction of the \$132 is this?
Give your answer as a fraction in its simplest form.

Answer(c) ..... [2]

(d) His earnings of \$150 per week increase by 8%.

Calculate his new earnings.

Answer(d) \$ ..... [2]

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3 Mrs Sesay leaves home by car at 13 30.
After 15 minutes she stops at a shopping centre, 8 kilometres from home.

(a) Calculate the average speed for her journey.
Give your answer in kilometres per hour.

Answer(a) ..... km/h [2]

(b) She leaves the shopping centre half an hour later.
She travels a further 12 kilometres at the speed of 36 km/h to Villeneuve.

(i) Write down the time when she leaves the shopping centre.

Answer(b)(i) ..... [1]

(ii) Calculate the time, in minutes, that she takes to travel from the shopping centre to Villeneuve.

Answer(b)(ii) ..... min [2]

(iii) On the grid opposite, complete the travel graph showing her journey. [2]

(c) Her son, Braima, also leaves home at 13 30 and cycles the 20 kilometres to Villeneuve.
He cycles at a speed of 15 km/h.

(i) Calculate how long his journey takes.
Give your answer in hours and minutes.

Answer(c)(i) ..... h ..... min [2]

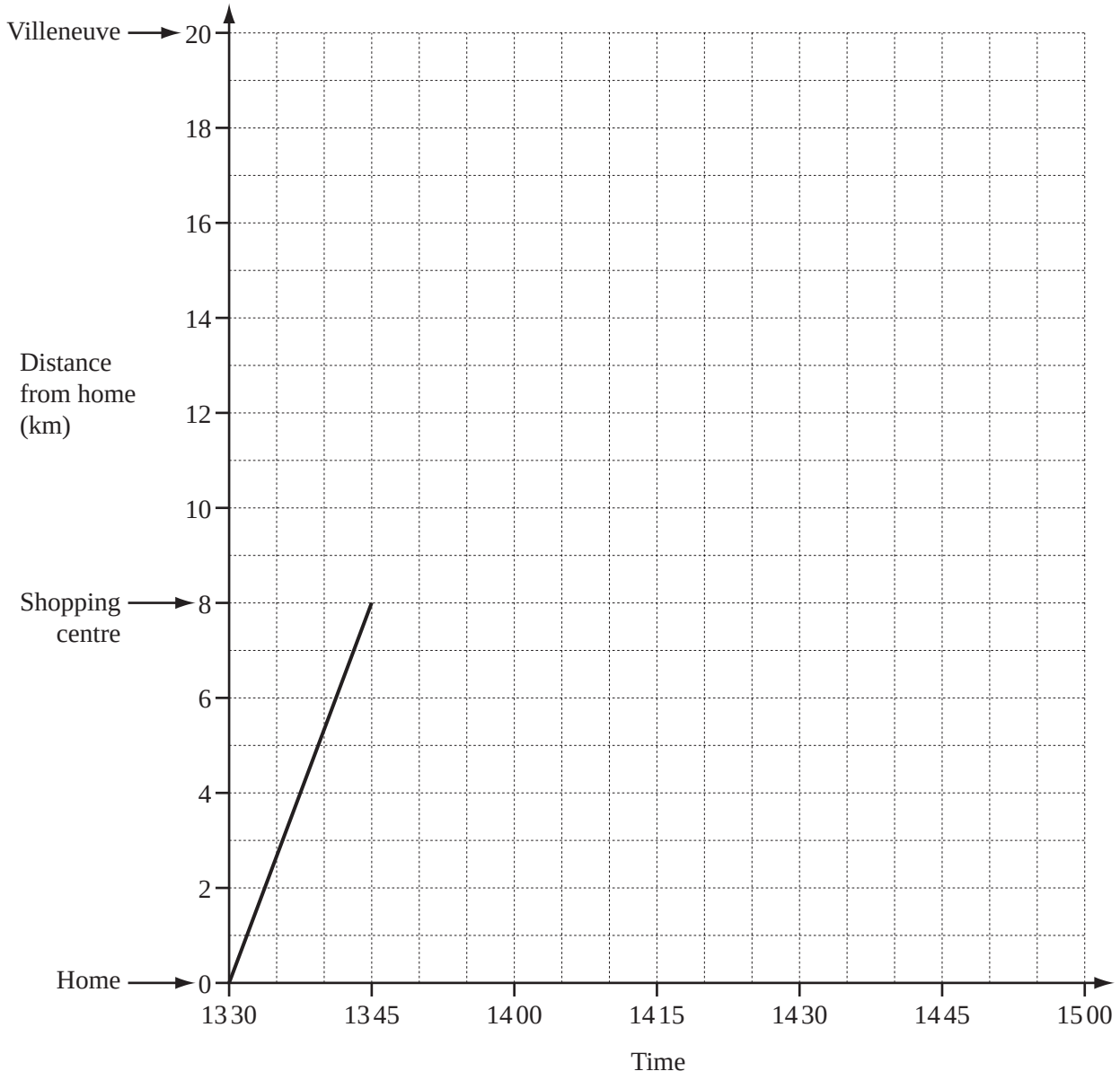
(ii) Show his journey on the grid. [1]

(iii) How many minutes after his mother does Braima arrive at Villeneuve?

Answer(c)(iii) ..... min [1]

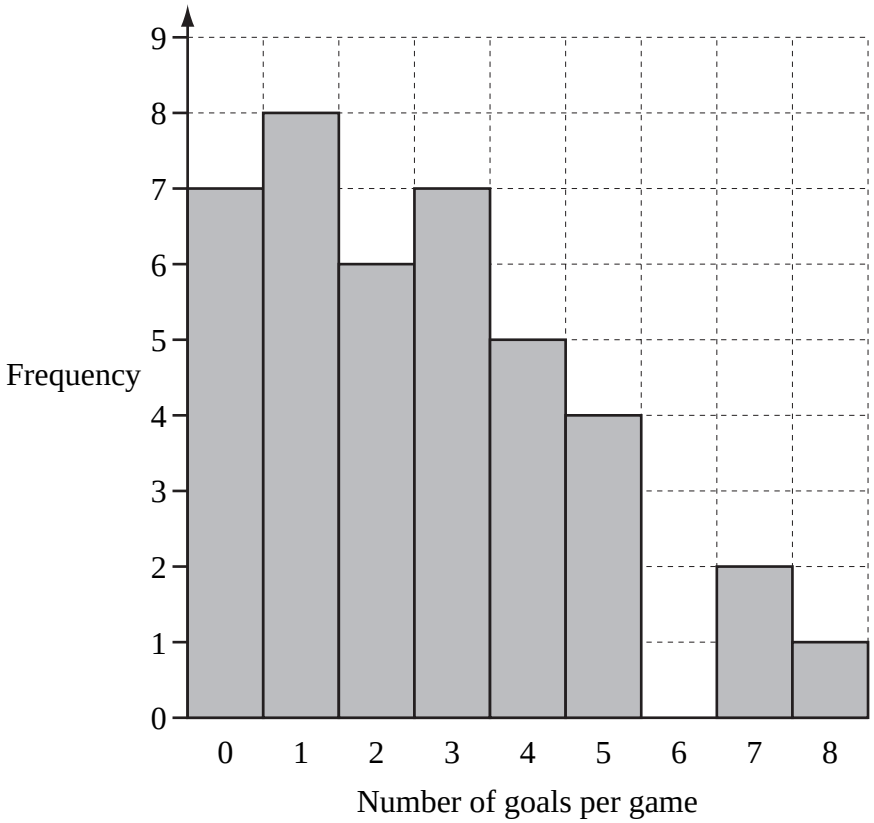
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4



Karen keeps a record of how many goals United score in each of 40 games.
She draws a bar chart to show this information.

(a) Use the information in the bar chart to complete the frequency table below.

Number of goals per game	0	1	2	3	4	5	6	7	8
Frequency							0	2	1
Frequency × Number of goals							0	14	8

[2]

(b) (i) How many goals did United score in the 40 games?

Answer(b)(i) ..... [1]

(ii) Calculate the mean number of goals scored per game.

Answer(b)(ii) ..... [2]

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(iii) Find the median.

Answer(b)(iii) ..... [2]

(iv) Write down the mode.

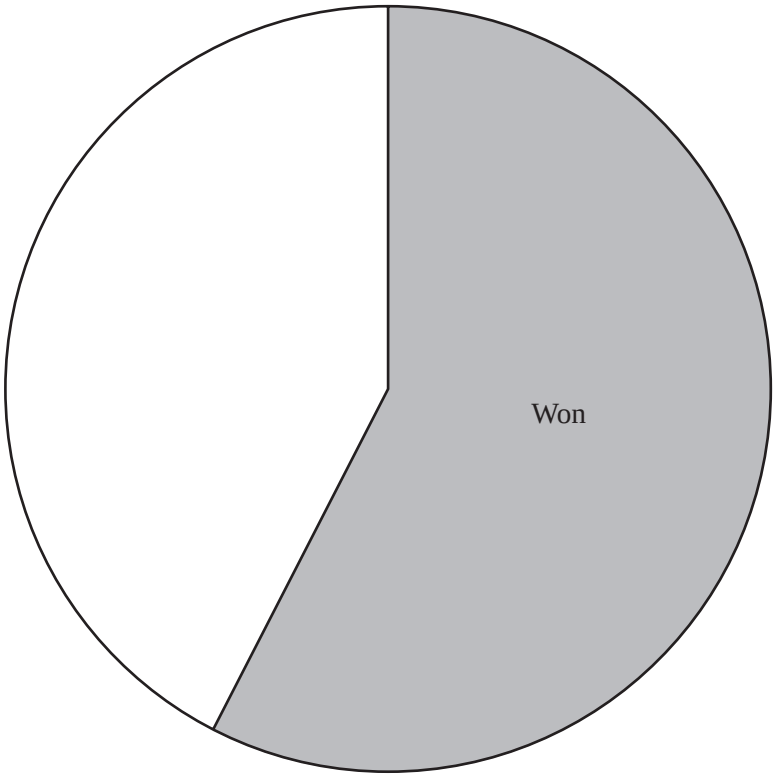
Answer(b)(iv) ..... [1]

(c) United won 23 games and lost 12 games.
The other games ended in a draw.

(i) How many games ended in a draw?

Answer(c)(i) ..... [1]

(ii) Complete the pie chart accurately to represent these results. Label the sectors.



[2]

(d) If one game from the 40 is chosen at random, use the information in **part (c)** to find the probability that United

(i) won,

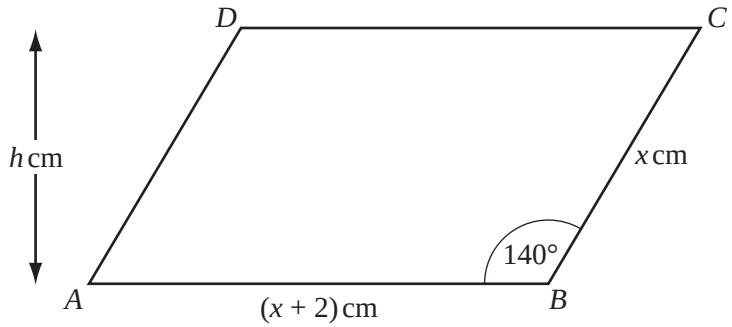
Answer(d)(i) ..... [1]

(ii) did not draw.

Answer(d)(ii) ..... [1]

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5



NOT TO SCALE

In the parallelogram $ABCD$, $AB = (x + 2)$ cm, $BC = x$ cm and angle $ABC = 140°$.

(a) When $x = 10$,

(i) use trigonometry to calculate the height, h cm, of the parallelogram,

Answer(a)(i) $h =$ ..... [2]

(ii) calculate the area of the parallelogram.

Answer(a)(ii) ..... cm^2 [1]

(b) For a **different** value of x, the perimeter of the parallelogram is 38 cm.

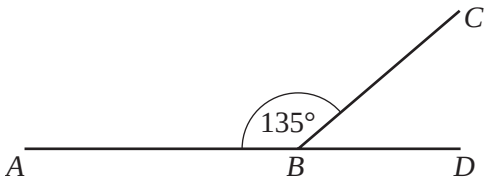
Write down an equation in x and solve it.

Answer(b) $x =$ ..... [3]

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6 (a)



NOT TO SCALE

In the diagram, *ABD* is a straight line and angle *ABC* = 135°.

(i) Find the size of angle *CBD*.

Answer(a)(i) Angle *CBD* = ... [1]

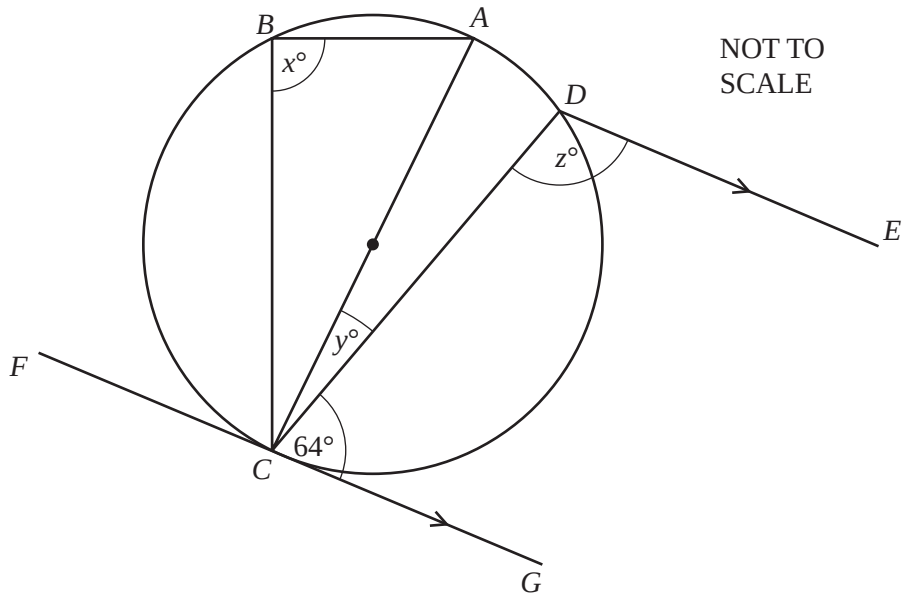
(ii) A regular polygon has interior angles of 135°.
Find the number of sides of the polygon.

Answer(a)(ii) ..... [2]

(iii) Write down the name of the polygon in **part (a)(ii)**.

Answer(a)(iii) ..... [1]

(b)



NOT TO SCALE

A, *B*, *C*, and *D* lie on a circle. *AC* is a diameter.
FCG is a tangent to the circle at *C*. *DE* is parallel to *CG*.
Find the values of *x*, *y* and *z*.

Answer(b) x = ...

y = ...

z = ... [5]

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7 An area of land *ABCDEF* is in the shape of a hexagon.
Part of a scale drawing of the land is shown on the opposite page.
A pond, *P*, is inside the hexagon.
On the plan, 1 centimetre represents 20 metres.

Parts (a), (b), (c) and (f) must be completed using a ruler and compasses only.
All construction arcs must be clearly shown.

(a) On the land, $AF = 80$ m and $EF = 100$ m.

On the scale drawing, find the point *F*, by construction.
Draw the lines *AF* and *EF*. [2]

(b) On the scale drawing, construct the perpendicular bisector of *CD*.
Label the point *M* where the bisector crosses *CD*. [2]

(c) On the scale drawing, construct the bisector of angle *BCD*. [2]

(d) The bisectors from **part (b)** and **part (c)** meet at *L*.

(i) Measure and write down the length of *LM* in centimetres.

Answer(d)(i) ..... cm [1]

(ii) Find the distance between *L* and *M* on the land.
Give your answer in metres.

Answer(d)(ii) ..... m [1]

(e) Triangle *CML* is a field for sheep.

Calculate the area of this field.

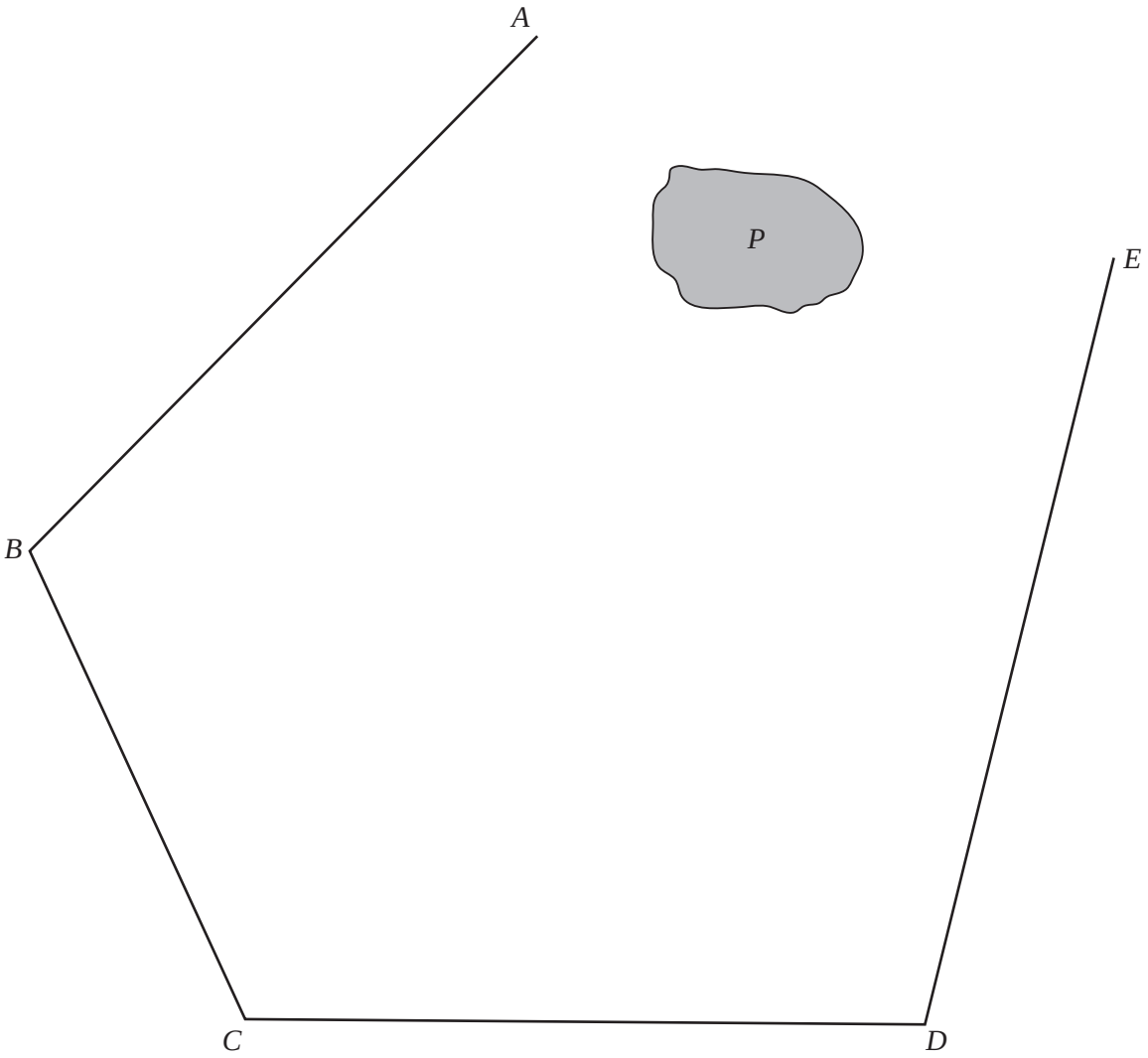
Answer(e) ..... m^2 [2]

(f) There is also a field for cows inside the hexagon.
This field is the region nearer to *D* than to *C* **and** less than 120 m from *D*.

By constructing a suitable locus on the scale drawing, find and label this region *R*. [2]

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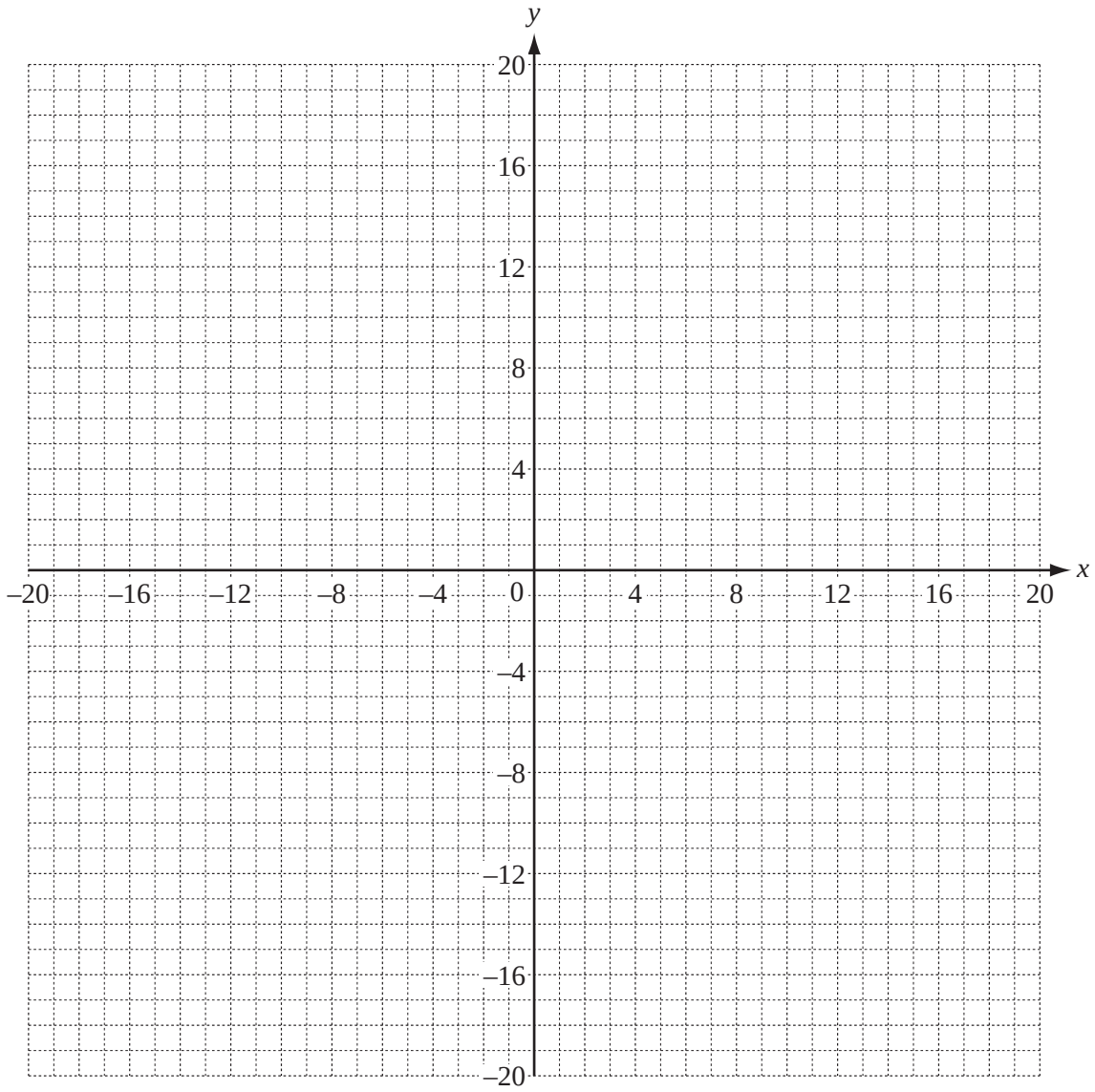
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8 **(a)** Complete the table for the function $y = \frac{18}{x}$, $(x \neq 0)$.

x	−18	−9	−6	−3	−2	−1		1	2	3	6	9	18
y				−6	−9	−18		18	9	6			

[3]

(b) On the grid below, draw the graph of $y = \frac{18}{x}$ for $-18 \leqslant x \leqslant -1$ and $1 \leqslant x \leqslant 18$.



[4]

(c) Write down the order of rotational symmetry of the graph.

Answer(c) ..... [1]

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(d) **(i)** On the grid, draw the graph of $y = x$. [1]

(ii) Write down the co-ordinates of the points of intersection of $y = x$ and $y = \frac{18}{x}$.

Answer(d)(ii) (..... , ...) and (..... , ...) [2]

(e) On the grid, draw the reflection of $y = x$ in the y-axis. [1]

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9 **(a)** Simplify the following expressions.

(i) $5k + 3p - 2 + p - 2k - 5$

Answer(a)(i) ..... [2]

(ii) $5y^2 - 4x + 5x - 7y^2$

Answer(a)(ii) ..... [2]

(b) Expand the following expressions.

(i) $3 (4 + 7g)$

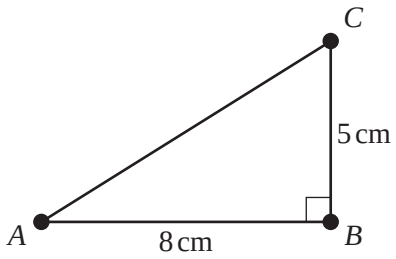
Answer(b)(i) ..... [1]

(ii) $5m (5m^2 - t^2)$

Answer(b)(ii) ..... [2]

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10 Three bolts at A, B and C join the rods AB, BC and CA to form the right-angled triangle, ABC. Angle $ABC = 90°$, $AB = 8$ cm and $BC = 5$ cm.



NOT TO SCALE

(a) Calculate

(i) the length of the rod AC,

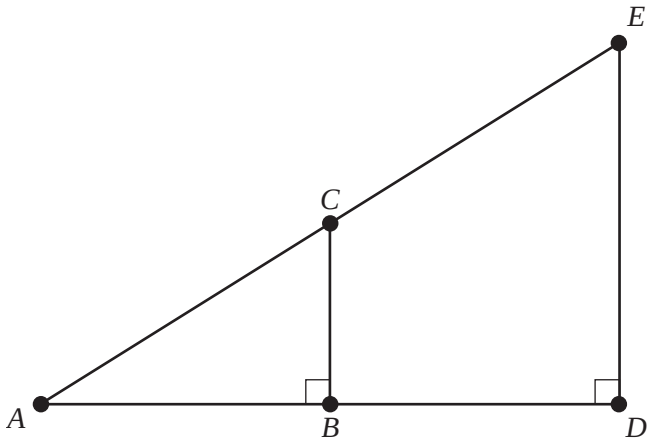
Answer(a)(i) $AC =$ ..... cm [2]

(ii) angle CAB.

Answer(a)(ii) Angle $CAB =$ ..... [2]

(b) Another right-angled triangle, ADE, is formed by adding rods to triangle ABC.

AC is extended to E and AB is extended to D, with more bolts at D and E.
Rods AB and BD are the same length.



NOT TO SCALE

(i) Complete the following statement.

Triangle ADE is ..... to triangle ABC. [1]

(ii) Describe clearly the **single** transformation which maps triangle ABC onto triangle ADE.

Answer(b)(ii) ..... [3]

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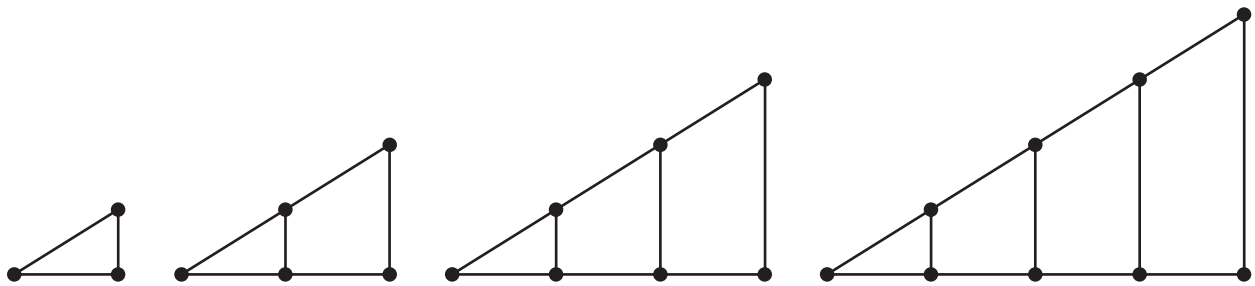


Diagram 1 Diagram 2 Diagram 3 Diagram 4

(c) The pattern of diagrams shown above is continued by adding more rods and bolts.

Complete the table below.

Diagram	1	2	3	4	5
Number of bolts	3	5	7		

[2]

(d) How many bolts are required for

(i) Diagram 10,

Answer(d)(i) ..... [1]

(ii) Diagram n?

Answer(d)(ii) ..... [2]

(e) The number of bolts in Diagram n is 47.

Find the value of n.

Answer(e) $n =$ ..... [2]

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