UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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4405903504

MATHEMATICS **0580/32**

Paper 3 (Core) **October/November 2012**

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 **16** printed pages.

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1 An area of $94\,500\,m^2$ in a city is developed.

(a) The area is divided into housing, shops and a park in the ratio

$$\text{housing} : \text{shops} : \text{park} = 7 : 6 : 5 .$$

(i) Show that the area of the park is $26\,250\,m^2$.

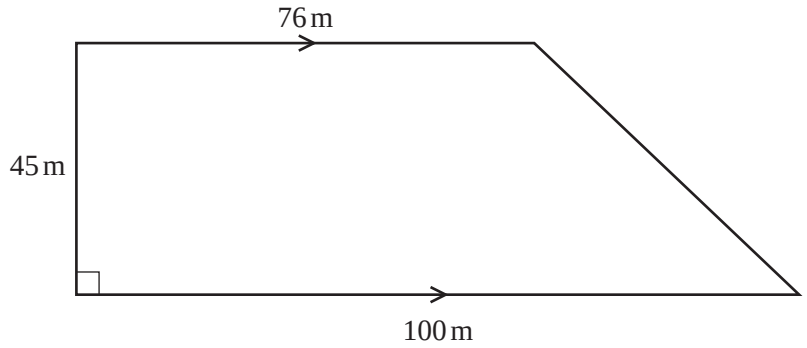
Answer(a)(i)

[2]

(ii) Calculate the area for housing.

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

(b) The diagram shows the children's playground in the park.



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(i) Calculate the area of the playground.

Answer(b)(i) ..... m^2 [2]

(ii) What fraction of the area of the park does the playground occupy?

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

(c) Buildings occupy $30\,625\,m^2$ of the area for housing.

Calculate the percentage of the area for housing occupied by buildings.

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

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(d) Of the buildings, $\frac{5}{12}$ are bungalows and $\frac{3}{8}$ are houses.

The rest of the buildings are apartments.

(i) Complete these equivalent fractions.

$\frac{5}{12} = \frac{\quad}{24}$ $\qquad$ $\frac{3}{8} = \frac{\quad}{24}$ [2]

(ii) Show that $\frac{5}{24}$ of the buildings are apartments.

Answer(d)(ii)

[1]

(iii) There are 120 buildings altogether.

Work out the number of houses.

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

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2 **(a)** The table shows some values of the function $y = x - \frac{8}{x}$.

x	-8	-6	-5	-4	-2	-1		1	2	4	5	6	8
y	-7	-4.7	-3.4	-2		7			-2		3.4	4.7	7

(i) Complete the table. [3]

(ii) On the grid on the opposite page, draw the graph of $y = x - \frac{8}{x}$ for $-8 \leqslant x \leqslant -1, 1 \leqslant x \leqslant 8$. [5]

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

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

(iv) Use your graph to solve the equation $x - \frac{8}{x} = 0$.

Answer(a)(iv) $x =$ ..... or $x =$ ..... [2]

(b) **(i)** Write down the gradient of the line $y = \frac{1}{2}x + 1$.

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

(ii) Complete the table below for the line $y = \frac{1}{2}x + 1$.

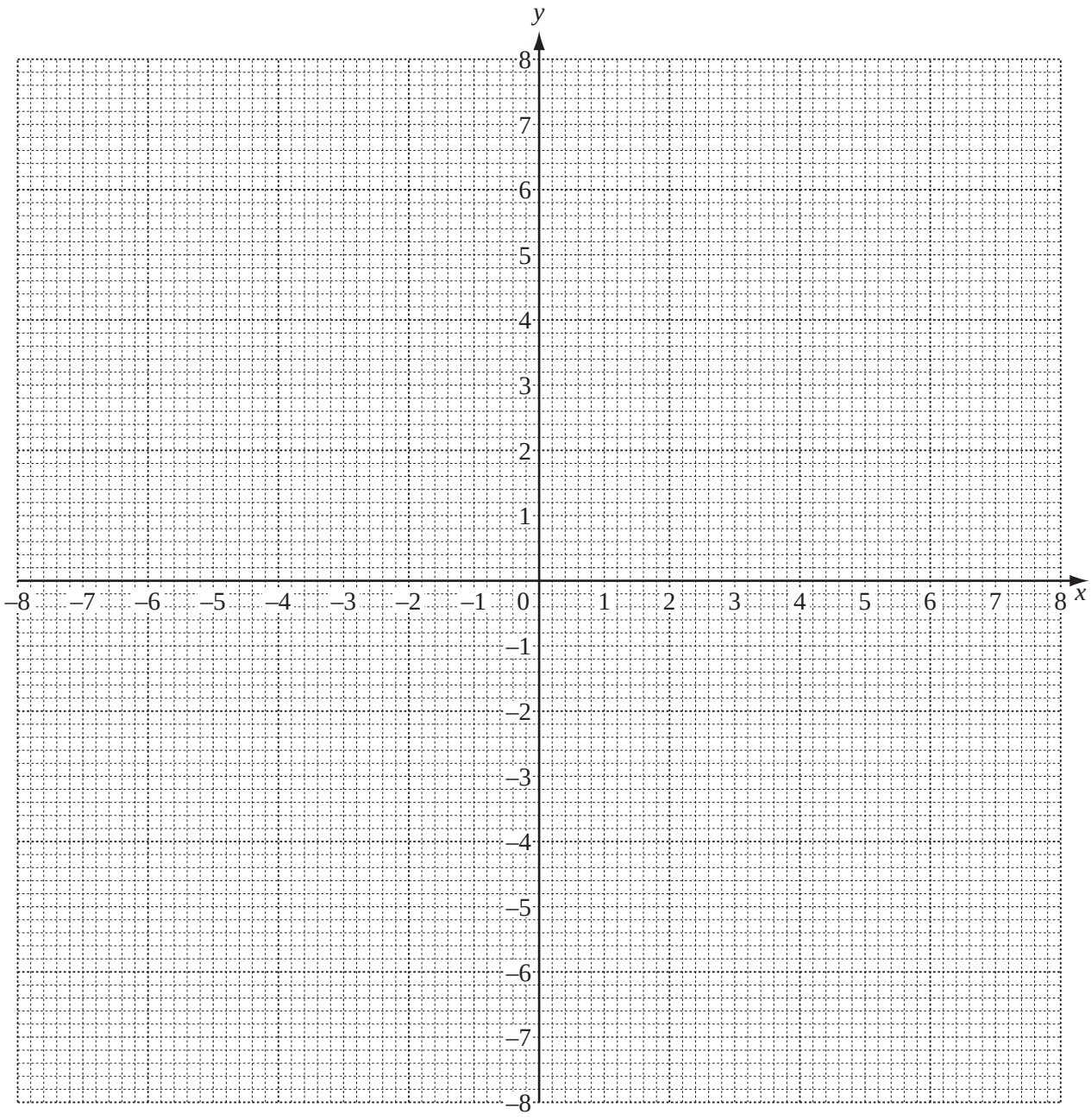
x	-8	-4	0	4	8
y	-3			3	

[2]

(iii) On the grid, draw the line $y = \frac{1}{2}x + 1$ for $-8 \leqslant x \leqslant 8$. [1]

(c) Write down the co-ordinates of the points of intersection of $y = x - \frac{8}{x}$ and $y = \frac{1}{2}x + 1$.

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



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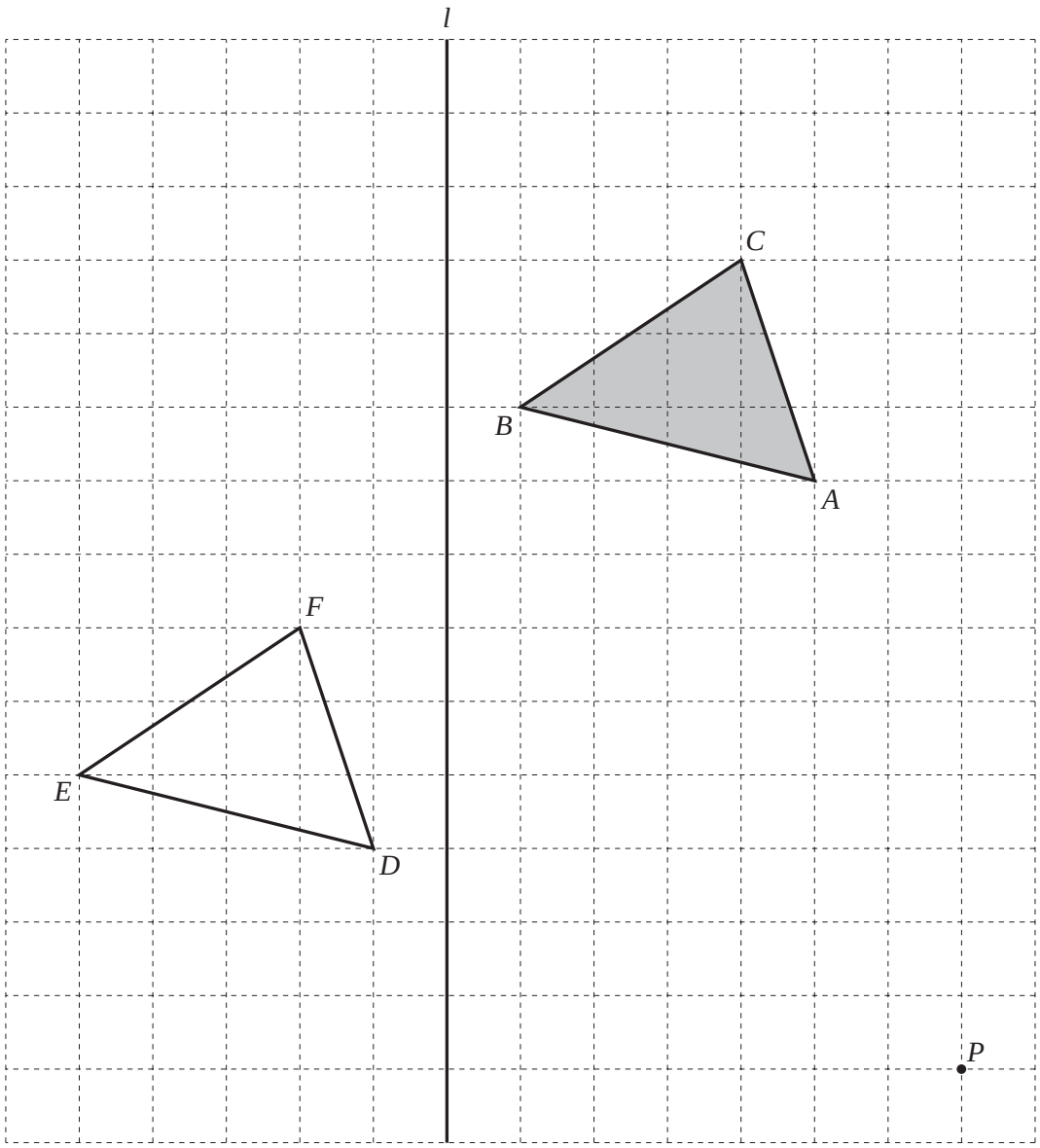

(a) Describe fully the **single** transformation that maps triangle *ABC* onto triangle *DEF*.

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

(b) **(i)** Reflect triangle *ABC* in the line *l*.
Label the image *M*. [1]

(ii) Rotate triangle *ABC* through 90° clockwise about vertex *A*.
Label the image *T*. [2]

(c) Triangle *DEF* is enlarged by scale factor 2.
The image of vertex *D* is the point labelled *P* on the grid.

Mark the image of vertex *E*. Label this point *Q*.
Mark the image of vertex *F*. Label this point *R*. [2]

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4 (a)

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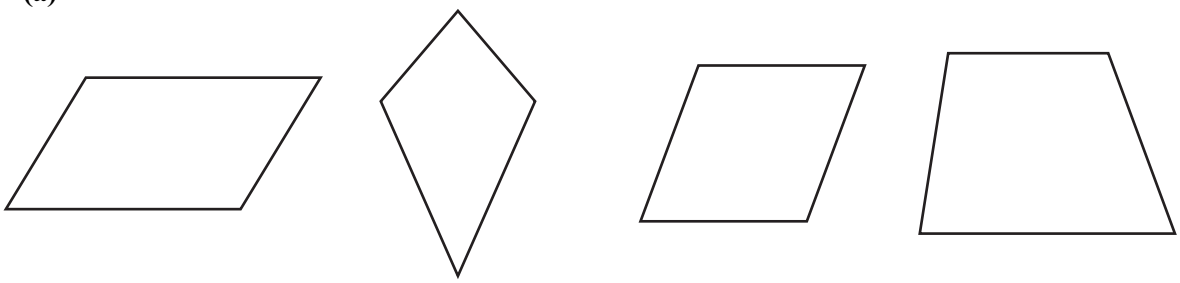


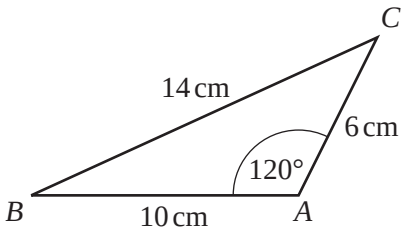
A **B** **C** **D**

Complete the table for each of the different quadrilaterals **A**, **B**, **C** and **D**.

Quadrilateral	Mathematical name	Number of lines of symmetry
A		
B		
C		
D		

[8]

(b)



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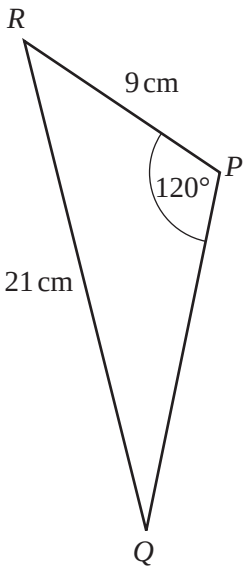

The two triangles are similar.

(i) Write down the angle in triangle *PQR* that corresponds to angle *B* in triangle *ABC*.

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

(ii) Work out *PQ*.

Answer(b)(ii) *PQ* = ... cm [2]

5 **(a)** The colours of the cars at a car centre are red, blue, green, black and white.
The pie chart shows some information about the number of cars of each colour.

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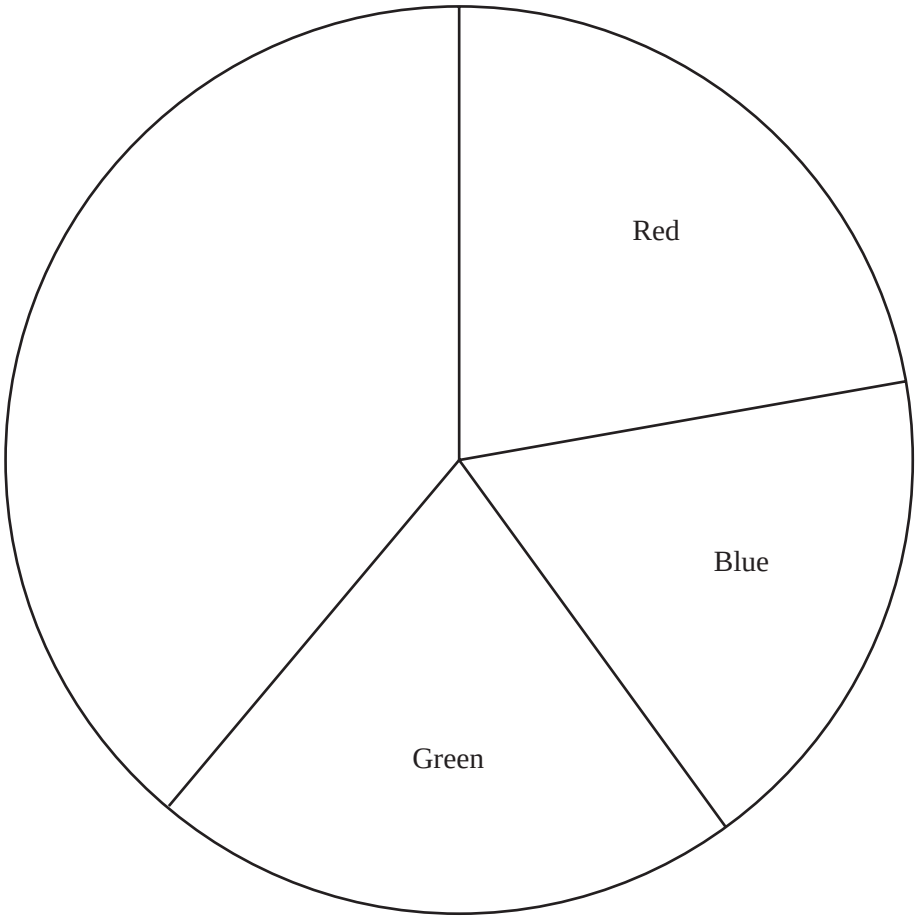

(i) There are 60 red cars.

Show that the total number of cars is 270.

Answer(a)(i)

[2]

(ii) Calculate the number of blue cars and the number of green cars.

Answer(a)(ii) Blue .....

Green ..... [3]

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(b) There are 39 black cars.

(i) Calculate the sector angle in the pie chart for the black cars.

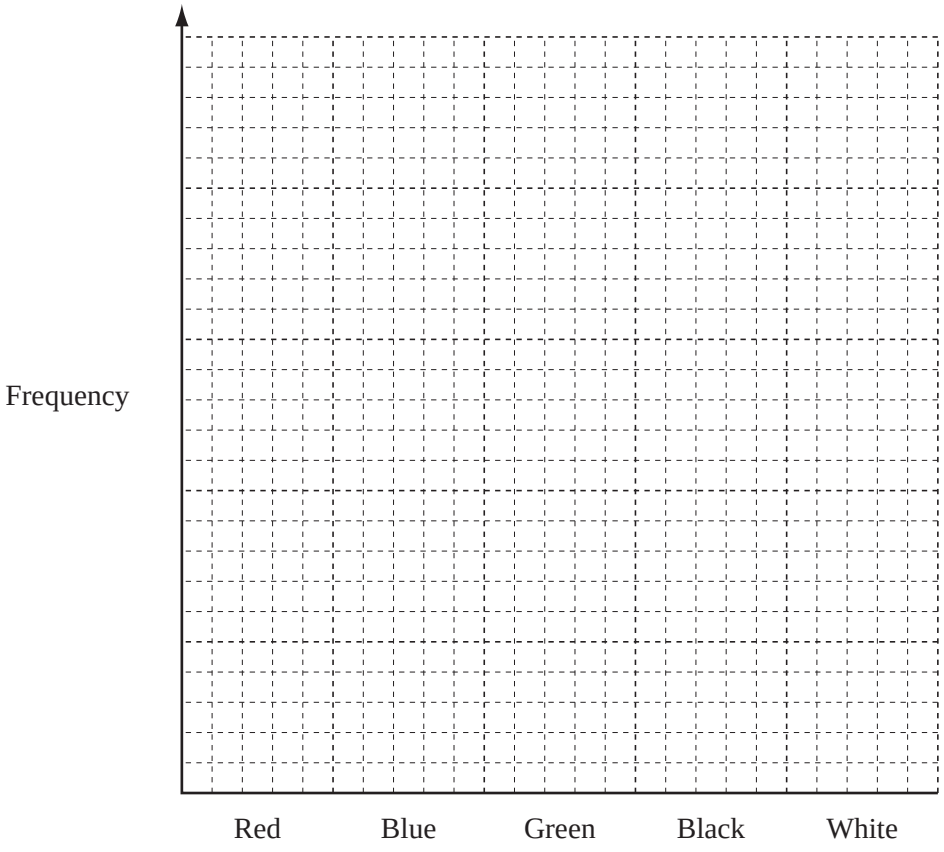
Answer(b)(i) ..... [2]

(ii) Complete the pie chart.
Label each of your sectors. [2]

(c) The manager asked 100 people which colour of car they prefer.
The results are shown in the table.

Red	Blue	Green	Black	White
25	40	6	16	13

(i) On the grid, draw a bar chart to show this information.
Complete the scale on the frequency axis.



[3]

(ii) The manager uses the results when she orders 900 cars, in these colours, for the next year.

How many blue cars do you expect her to order?

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

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6 Johno travelled from his home on the North Island of New Zealand to Blenheim on the South Island. He left home at 06 30 and drove 50 km to Wellington where he waited for the 08 20 ferry.

(a) Use information from the travel graph opposite to write down

(i) the time Johno arrived at Wellington,

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

(ii) the number of hours and minutes that he waited in Wellington for the 08 20 ferry.

Answer(a)(ii) ..... h ..... min [1]

(b) The ferry left Wellington at 08 20 and sailed 92 km to Picton on the South Island. The ferry arrived at 11 40.

On the travel graph, show the ferry journey. [1]

(c) Johno waited 20 minutes to get off the ferry. He then drove for 30 minutes at an average speed of 40 km/h to Blenheim.

Complete the travel graph for his journey.

[3]

(d) Calculate his average speed, in km/h, for the whole journey from his home to Blenheim.

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

(e) Another ferry left Picton at 10 10 and arrived at Wellington at 13 20.

(i) On the travel graph, show the journey of this ferry. [2]

(ii) How far were the two ferries from **Wellington** when they passed each other?

Answer(e)(ii) ..... km [1]

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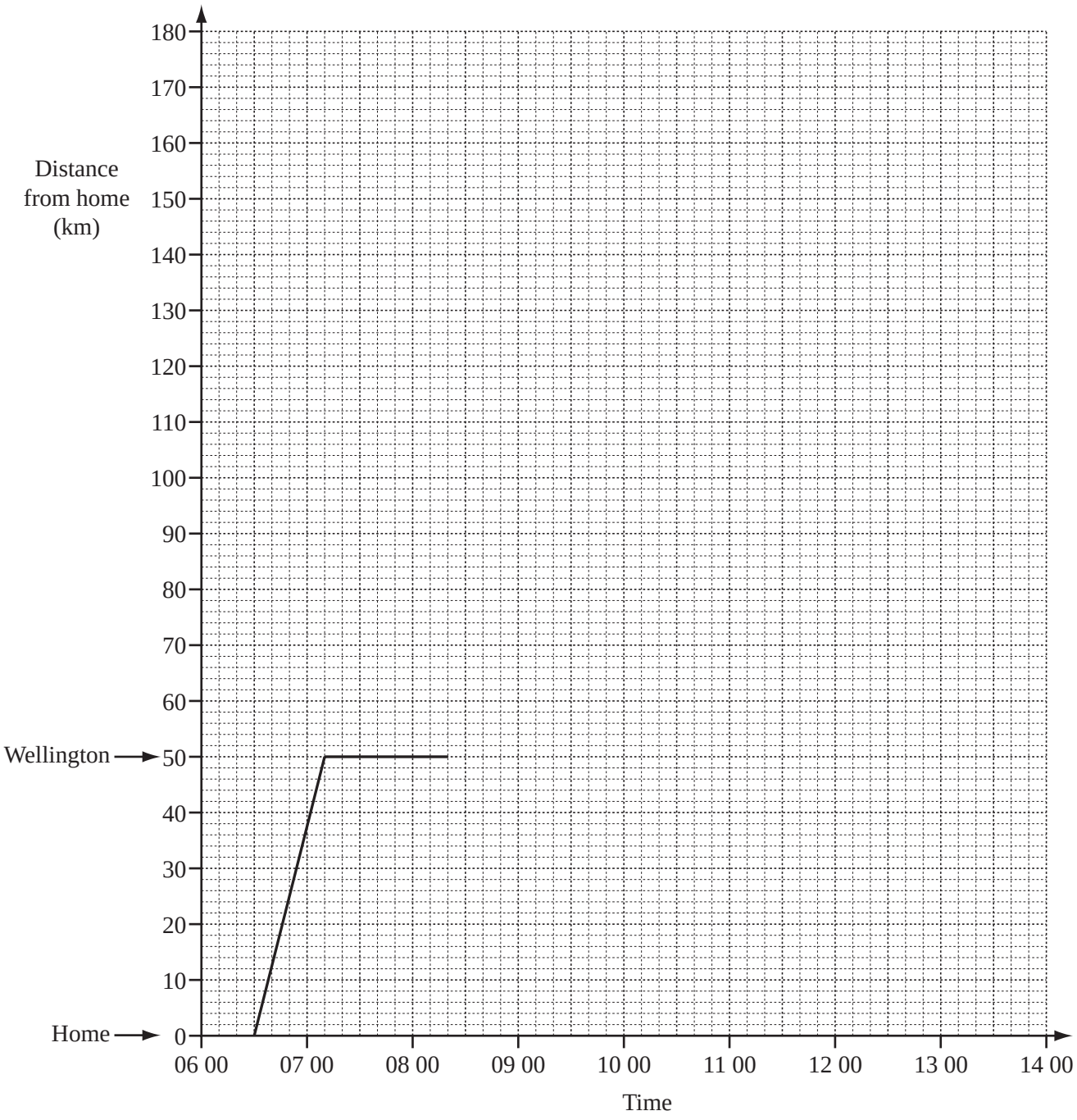

7 The diagram shows the plan of a field *QRST*.
The scale is 1 centimetre represents 10 metres.

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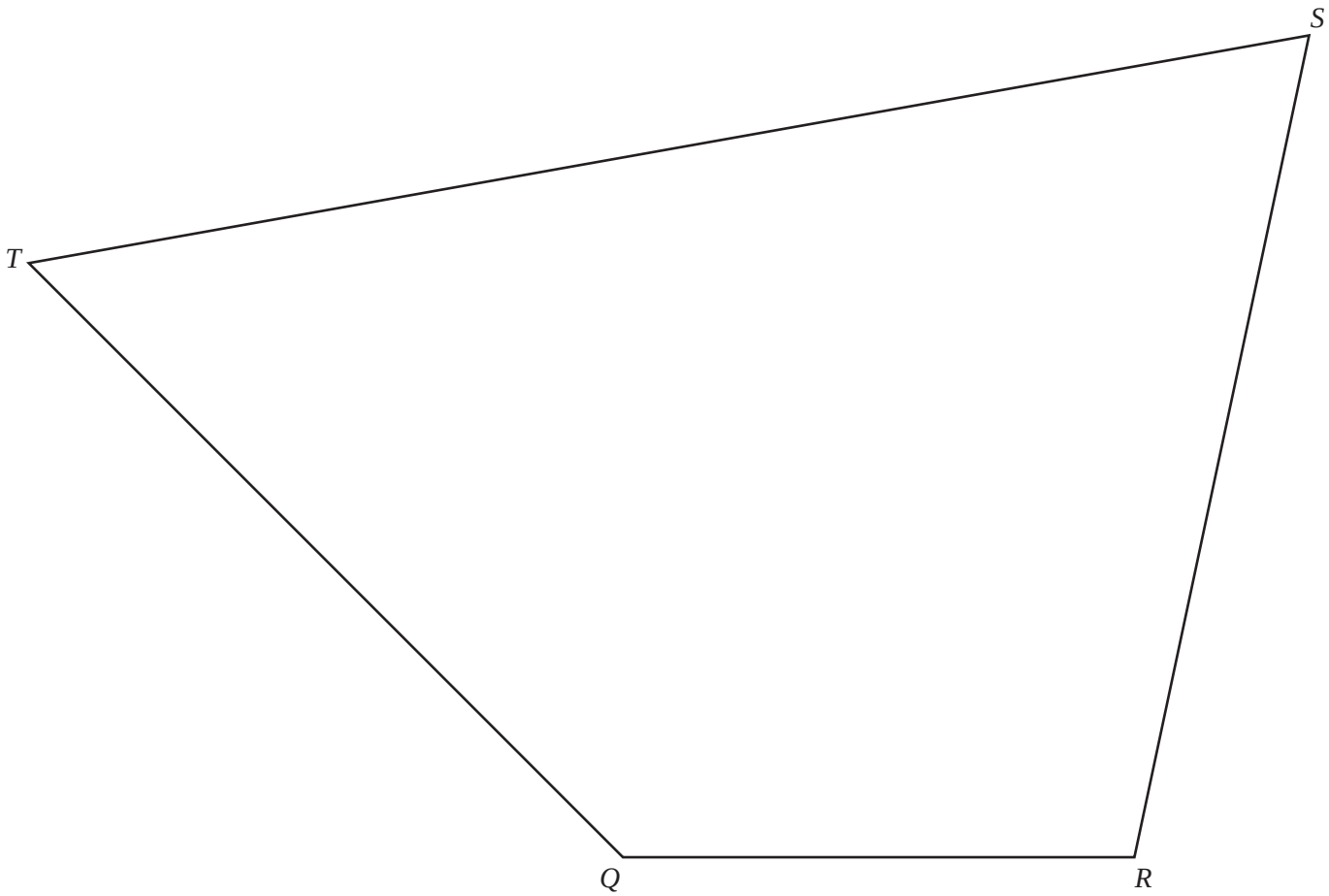

Scale: 1 cm = 10 m

(a) Nothing is grown within 35 metres of *T*.

Construct the boundary, inside *QRST*, of the region where nothing is grown. [2]

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(b) Use a straight edge and compasses only for the constructions in parts (b)(i) and (b)(ii). Leave in all your construction arcs.

(i) Construct the bisector of angle RQT.
Draw your line to meet the side ST. [2]

(ii) Construct the locus of points equidistant from Q and from R.
Draw your line to meet the side ST. [2]

(c) Flowers are grown in the region

- nearer to QR than to QT

and

- nearer to Q than to R.

(i) Label this region F. [1]

(ii) Calculate the actual area in which flowers are grown.
Give your answer in square metres.

Answer(c)(ii) ..... m^2 [4]

8

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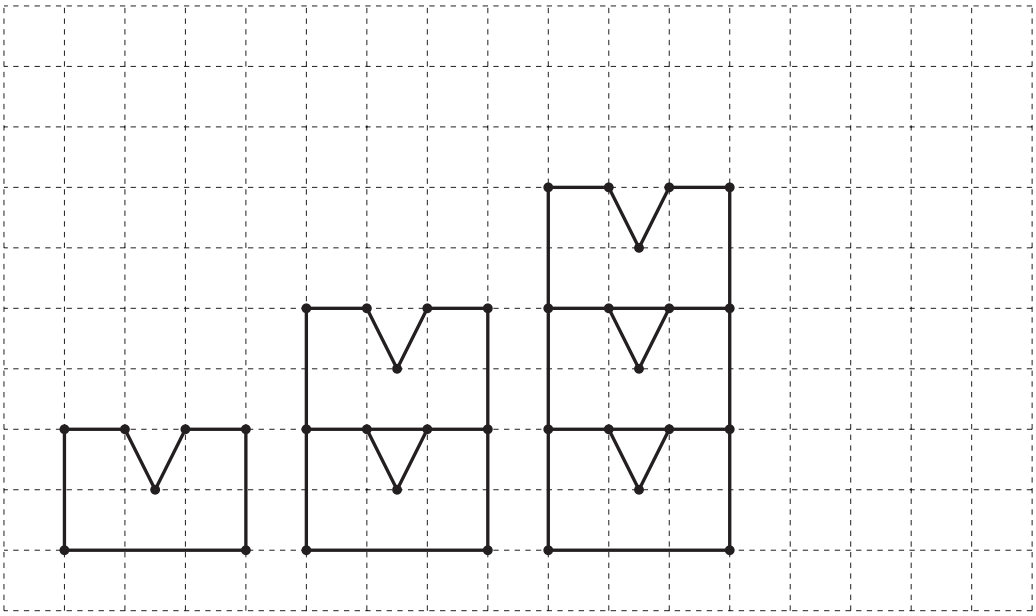

Diagram 1 Diagram 2 Diagram 3 Diagram 4

(a) This pattern of diagrams forms a sequence.

(i) On the grid, draw Diagram 4. [1]

(ii) Complete this table.

Diagram	1	2	3	4	5
Number of dots	7	12			

[2]

(b) How many dots will there be in

(i) Diagram *n*,

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

(ii) Diagram 29.

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

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(c) There are either 2 lines or 3 lines meeting at the dots in the Diagrams.

In Diagram 1 there are 0 dots where 3 lines meet.

In Diagram 2 there are 4 dots where 3 lines meet.

Complete the statements.

(i) In Diagram 3 there are ..... dots where 3 lines meet. [1]

(ii) In Diagram *n* there are ..... dots where 3 lines meet. [2]

(d) Find the number of dots where 2 lines meet in Diagram *n*.

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

Question 9 is printed on the next page.

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9 **(a)** Each day from Monday to Saturday Caroline buys a newspaper, costing d cents.
On Sunday she buys a newspaper costing 160 cents.
The total amount she spends on newspapers in a week is 430 cents.

(i) Write down an equation in d, to show this information.

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

(ii) Solve your equation to find d.

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

(iii) The price of the Sunday newspaper is increased by 15%.

Calculate the price of the Sunday newspaper after this increase.

Answer(a)(iii) ..... cents [2]

(b) Potatoes cost p cents per kilogram and carrots cost c cents per kilogram.

(i) Bernard buys 3 kilograms of potatoes and 2 kilograms of carrots.
An expression for the amount he spends is $3p + 2c$.
He spends 92 cents on these items.

Write down an equation, in p and c, to show this.

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

(ii) Eleanor buys 2 kilograms of potatoes and 5 kilograms of carrots.
She spends 153 cents on these items.

Write down an equation, in p and c, to show this.

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

(iii) Solve your equations to find p and c.

Answer(b)(iii) p = ...

c = ... [4]

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