Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

1726906154

MATHEMATICS **0581/32**

Paper 3 (Core) **October/November 2014**

2 hours

Candidates answer on the Question Paper.

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

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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.

CAMBRIDGE International Examinations

1 A building company buys 4 square kilometres of land.
On the land the company builds houses, shops and a school.

(a) Show that 4 square kilometres is equivalent to 4 000 000 square metres.

Answer(a)

[1]

(b) The company uses 5% of the land for roads and paths.

Show that the remaining area of land is 3 800 000 m^2.

Answer(b)

[1]

(c) The 3 800 000 m^2 of land is divided in the ratio houses : shops : school = 11 : 5 : 3.

(i) Show that the area for the school is 600 000 m^2.

Answer(c)(i)

[2]

(ii) Calculate the area for houses.

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

(iii) 140 m^2 is needed for each house.

Calculate, correct to the nearest 10, the number of houses that can be built.

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

(d) $\frac{3}{5}$ of the school area is for classrooms and $\frac{1}{8}$ is for other rooms.

The remainder is for sporting facilities.

(i) **Without using a calculator**, and showing all your working, find the fraction of the school area for sporting facilities.

Answer(d)(i) ..... [3]

(ii) The school has an area of 600 000 m^2.

Work out the area for sporting facilities.

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

(e) To pay for materials, the building company borrows \$250 000 from a bank for 3 years.
The bank charges compound interest at a rate of 4% per year.

Calculate the **total** amount the company must pay back at the end of 3 years.

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

2 **(a)** Write down the mathematical name of a polygon with 8 sides.

Answer(a) .....

(b) Calculate the interior angle of a regular 8-sided polygon.

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

(c)

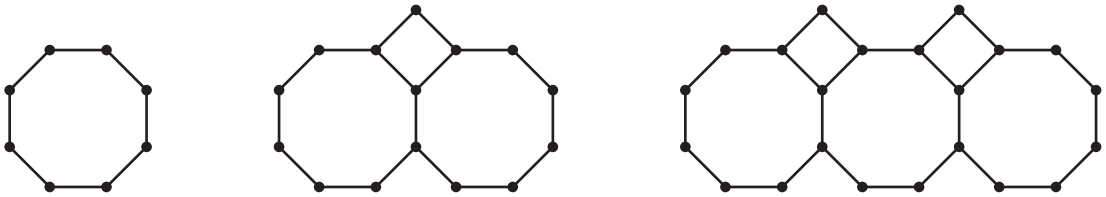


Diagram 1 Diagram 2 Diagram 3

The pattern of diagrams above forms a sequence.

(i) Complete the table.

Diagram	1	2	3	4	5
Number of dots	8	15			

[2]

(ii) Find an expression, in terms of n, for the number of dots in Diagram n.

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

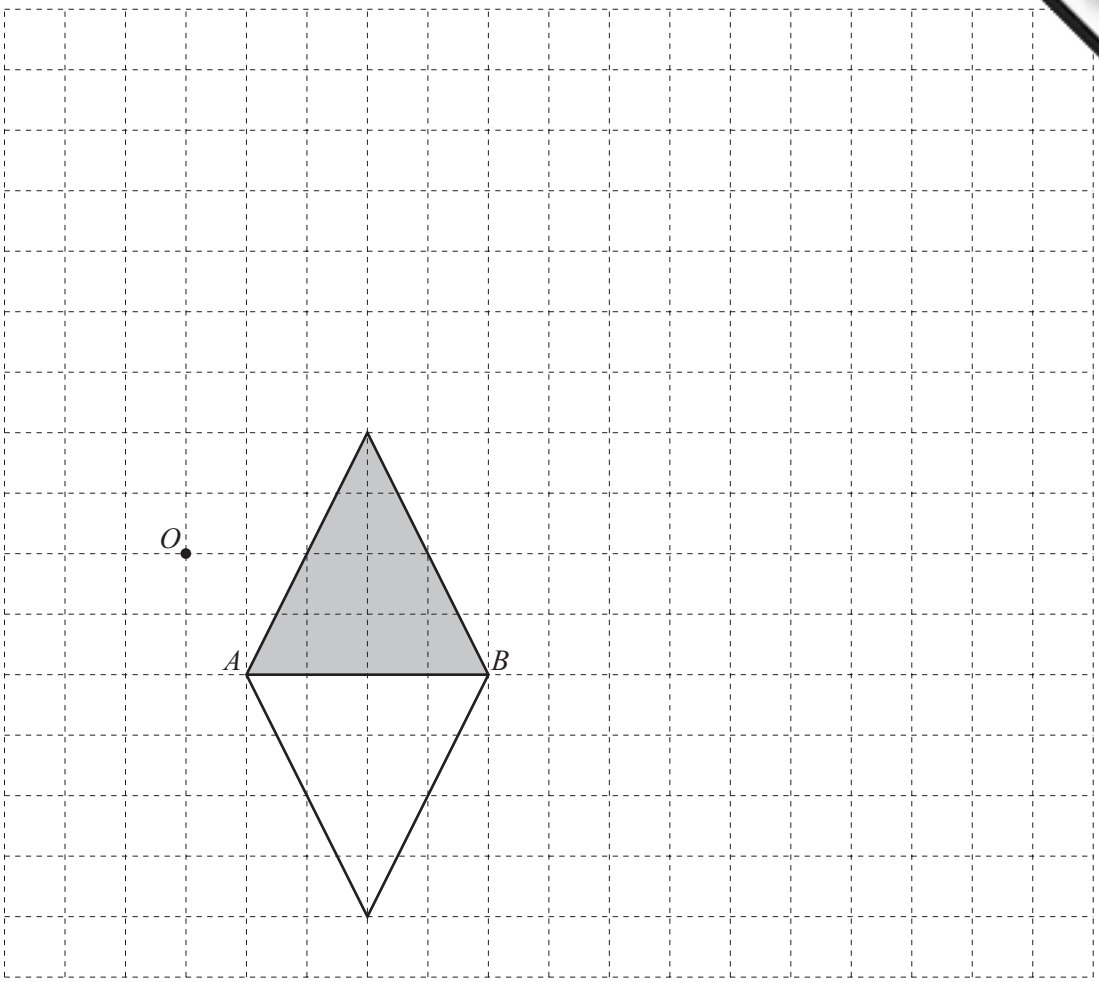
(iii) Find the number of dots in Diagram 10.

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

(iv) Find the value of n for a diagram with 92 dots.

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

3



(a) Describe fully two **single** transformations that each map the shaded triangle onto the unshaded triangle.

Answer(a) Transformation 1 .....

.....

Transformation 2 .....

..... [5]

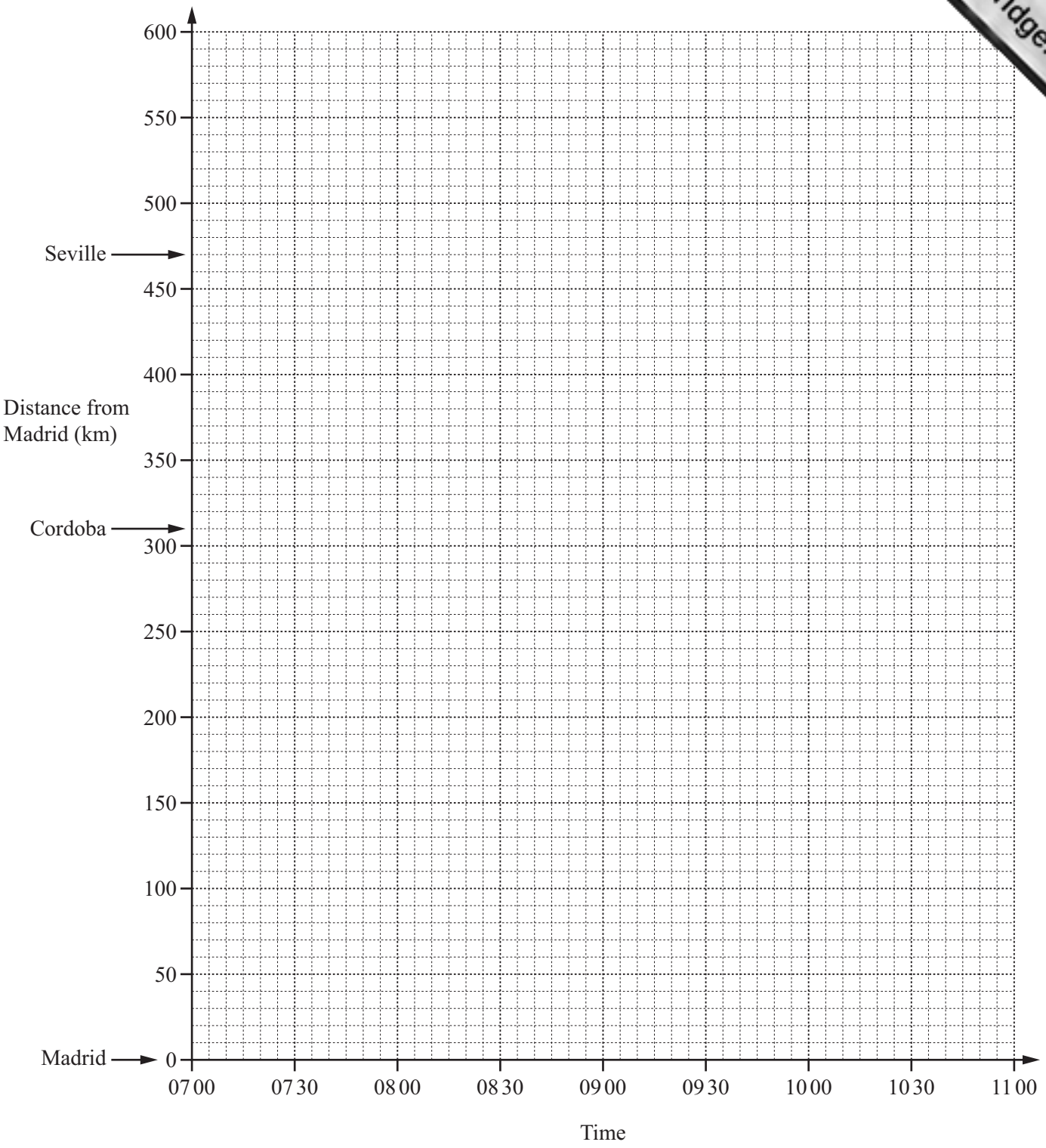
(b) On the grid, draw the image of

(i) the shaded triangle after a translation by the vector $\begin{pmatrix} -2 \\ 7 \end{pmatrix}$, [2]

(ii) the shaded triangle after an enlargement with scale factor 3 and centre O. [2]

(c) Draw the line of symmetry of the enlarged triangle in **part (b)(ii)**. [1]

4



(a) A train leaves Madrid at 07 00.
It arrives at Cordoba at 08 40 and stays at the station for 10 minutes.
It then continues to Seville arriving at 09 40.

(i) Show this journey on the grid opposite. [2]

(ii) Write down, in hours and minutes, the total time for this journey.

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

(iii) Calculate, in kilometres per hour, the average speed for the whole journey.

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

(b) Another train leaves **Seville** at 07 45.
It travels to Madrid without stopping at an average speed of 200 km/h.

(i) Calculate, in hours and minutes, the time taken for this journey.

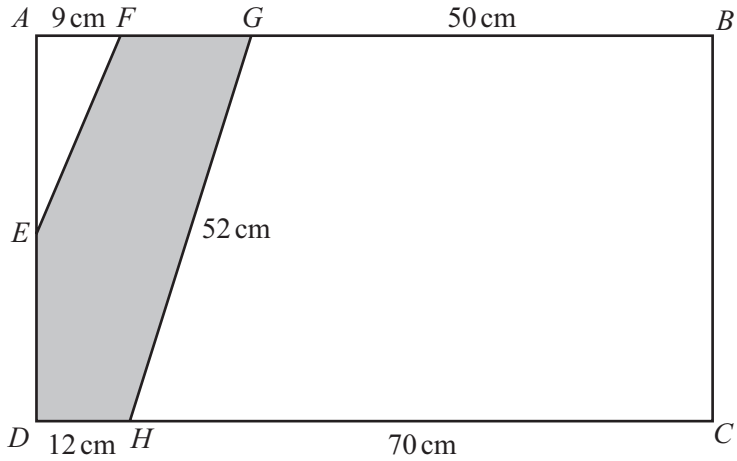
Answer(b)(i) ..... h ..... min [2]

(ii) Show this journey on the grid. [2]

(c) How far from Madrid were the trains when they passed each other?

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

5



NOT TO SCALE

The diagram shows a rectangle *ABCD* divided into three sections by the lines *EF* and *HG*. *AF* = 9 cm, *GB* = 50 cm, *DH* = 12 cm, *HC* = 70 cm and *HG* = 52 cm.

(a) Write down the mathematical name of

(i) quadrilateral *BCHG*,

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

(ii) the shaded polygon.

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

(b) **(i)** Show by calculation that *BC* = 48 cm.

Answer(b)(i)

[2]

(ii) Calculate the area of rectangle *ABCD*.

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

(c) Calculate

(i) the perimeter of *BCHG*,

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

(ii) the area of *BCHG*.

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

(d) *E* is the midpoint of *AD*.

Find the area of triangle *AEF*.

Answer(d) ..... cm^2 [3]

(e) Work out the area of the shaded polygon.

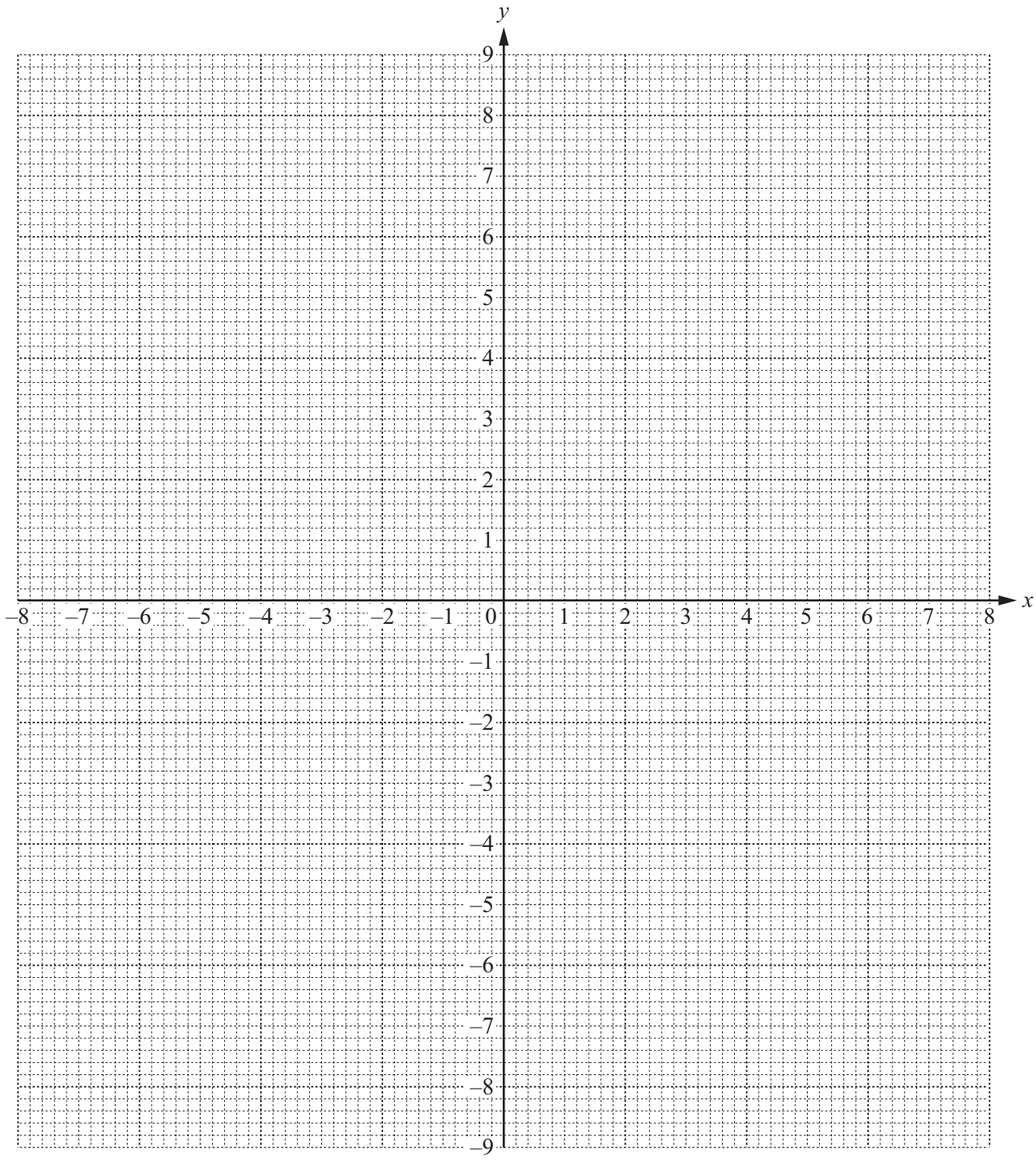
Answer(e) ..... cm^2 [1]

6 **(a)** **(i)** Complete the table of values for $y = \frac{20}{x}$.

x	–8	–5	–4	–2.5	2.5	4	5	8
y	–2.5	–4			8		4	

[2]

(ii) On the grid, draw the graph of $y = \frac{20}{x}$ for $-8 \leqslant x \leqslant -2.5$ and $2.5 \leqslant x \leqslant 8$.



[4]

(iii) By drawing a suitable line on your graph solve the equation $\frac{20}{x} = 6$.

Answer(a)(iii) $x =$ ..... [2]

(b)

x	–8	0	8
y			

(i) Complete the table for $y = \frac{1}{2}x - 1$. [2]

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

(iii) Write down the gradient of $y = \frac{1}{2}x - 1$.

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

(c) Write down the values of x at the points of intersection of the graphs of $y = \frac{20}{x}$ and $y = \frac{1}{2}x - 1$.

Answer(c) $x =$ ..... and $x =$ ..... [2]

7 **(a)** 21 11 7 29 3 20 24 8 18 14

For these numbers

(i) calculate the mean,

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

(ii) find the median,

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

(iii) find the range.

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

(b) The table shows the number of births for each month of 2013 in a hospital.

Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
319	299	336	309	334	336	348	363	351	347	331	335

(i) On the grid opposite, complete the bar chart.
The first 6 months have been drawn for you. [2]

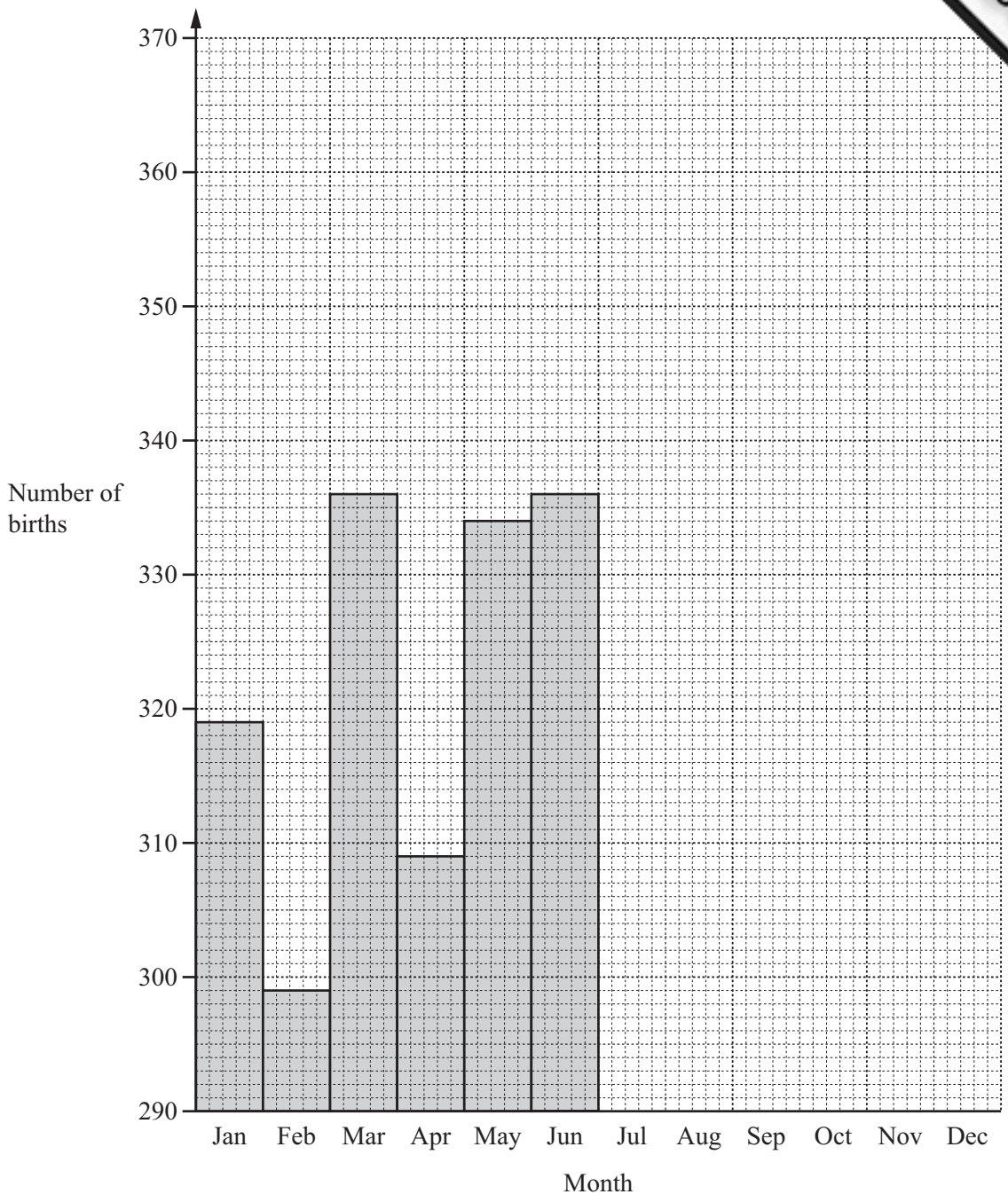
(ii) Write down the modal month.

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

(iii) A month is chosen at random.

Find the probability that the number of births in that month is greater than 340.

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



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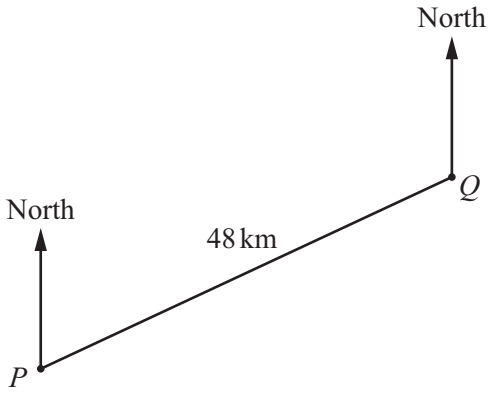


(a) The scale drawing shows a ship's voyage from port P to port Q.
The straight line distance from P to Q is 48 km.

(i) Measure the bearing of Q from P.

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

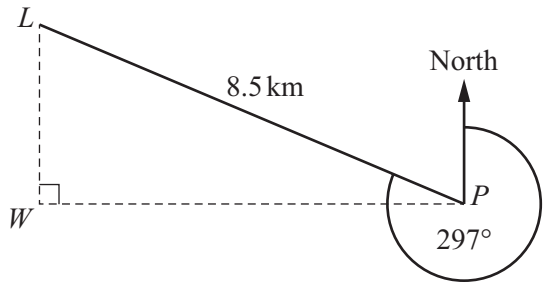
(ii) Complete the following statement.

The scale of the drawing is 1 centimetre represents ..... kilometres. [2]

(b) From port Q, the ship sails on a bearing of 125° for 76 km to port R.

Show this part of the voyage on the scale drawing. [3]

(c)



NOT TO SCALE

Another ship leaves port P and sails on a bearing of 297° to a lighthouse, L.
$PL = 8.5$ km.

(i) Show that angle $LPW = 27°$.

Answer(c)(i)

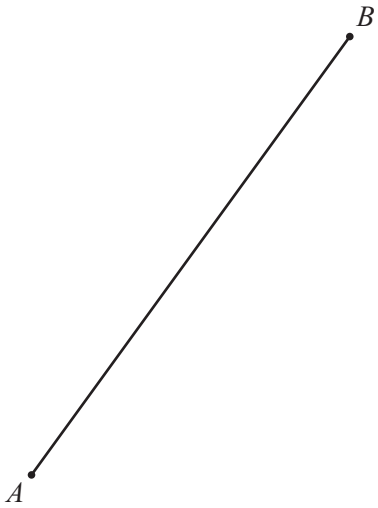
[1]

(ii) Using trigonometry, calculate PW.
Give your answer correct to 2 significant figures.

Answer(c)(ii) $PW =$ ..... km [3]

(d) The diagram shows the positions of two beacons, A and B.
A ship sails on a course that is the perpendicular bisector of the line AB.

Using a straight edge and compasses only, construct the ship's course.



[2]

9 Adriano hires a car.
The cost of hiring the car is \$36 per day plus 24 cents for each kilometre travelled.
He hires the car for 5 days and travels a total of 660 km.

(a) (i) Calculate the cost to hire the car.

Answer(a)(i) \$ ..... [3]

(ii) 15% tax is then added to this cost.
Calculate the total cost of hiring the car including tax.

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

(b) The car uses one litre of fuel to travel 11 km.
Fuel costs \$1.80 per litre.

(i) Work out the number of litres used to travel the 660 km.

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

(ii) Work out the cost of this fuel.

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

(iii) Find the total cost of hiring the car including tax and the fuel used.

Answer(b)(iii) \$ ..... [1]

(c) During the 5 days Adriano earns \$1600.

What percentage of his earnings is your answer to **part (b)(iii)**?
Give your answer correct to the nearest whole number.

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