UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

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MATHEMATICS **0580/32**

Paper 3 (Core) **May/June 2013**

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 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.

For Examiner's Use

1 (a)

3 5 8 10 10

For the numbers above, find

(i) the mean,

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

(ii) the mode,

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

(iii) the median,

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

(iv) the range.

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

(v) A sixth number, **11**, is added to the list.

Write down which **one** of the mean, the mode, the median and the range will stay the same.

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

(b) The table shows the results of asking 24 children their favourite colour.

Colour	Red	Blue	Yellow	Green	Pink
Number of children	4	8	2	3	7

Write down the probability, as a fraction, that the favourite colour of a child chosen at random is

(i) blue,

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

(ii) **not** pink.

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

(c) The information in **part (b)** is to be shown in a pie chart.

Work out the sector angle for green.
Do not draw the pie chart.

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

For Examiner's Use

2 Three children have some marbles.
Shireen has m marbles.
Nazaneen has three times as many marbles as Shireen.
Karly has 4 more marbles than Shireen.

(a) Write down an expression, in terms of m, for

(i) the number of marbles Nazaneen has,

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

(ii) the number of marbles Karly has.

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

(b) The three children have a total of 84 marbles between them.

(i) Write down an equation in m.

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

(ii) Solve your equation.

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

(c) Shireen weighs the 84 identical marbles.
Their total weight is 4.2 kg.

Calculate, in grams, the weight of one marble.

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

(d) The children now decide to share the 84 marbles in the ratio

Shireen : Nazaneen : Karly = 2 : 7 : 3 .

Calculate the number of marbles each receives.

Answer(d) Shireen .....

Nazaneen .....

Karly ..... [3]

[Turn over

For Examiner's Use

3 **(a)** A shop has maps arranged in bookcases.

(i) The length of one wall in the shop is 7.35 m.
Each bookcase is 120 cm wide.

Work out the maximum number of bookcases that will fit along this wall.

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

(ii) Each bookcase weighs 45 kg correct to the nearest 5 kg.

Write down the upper bound for the weight of a bookcase.

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

(b) During July and August the shop sells a total of 160 maps.
Some of these maps are driving maps and the rest are walking maps.

(i) Complete the table below.

	Driving maps	Walking maps	Total
July		15	
August	65		
Total		40	160

[2]

(ii) Write down the fraction of the total number of **walking** maps that are sold in July.
Give your answer in its simplest form.

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

For Examiner's Use

(c) The shopkeeper buys each map for \$5.50 .
He sells each map for \$6.60 .

(i) Calculate his percentage profit.

Answer(c)(i) ..... % [3]

(ii) Each map has a price in dollars (\$) and euros (€).
The price is \$6.60 or €3.52 .

Work out the exchange rate for €1 .

Answer(c)(ii) €1 = \$ ..... [2]

(d) The shop is open for 312 days each year.
The shopkeeper pays 3 employees \$47.66 each per day.

The total annual wage bill for the three employees is given by

$$3 \times 312 \times 47.66 .$$

(i) Rewrite this calculation so that **each** number is rounded to 1 significant figure.

$$3 \times \text{.....} \times \text{.....}$$ [1]

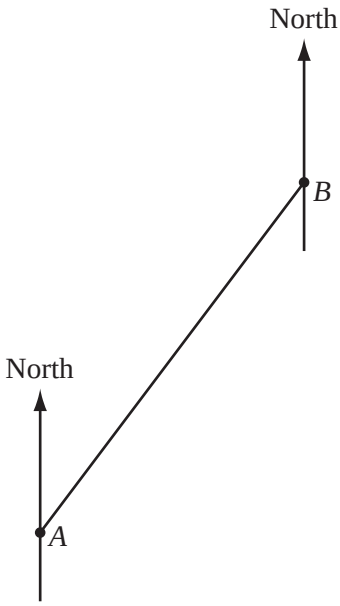
(ii) Use your answer to **part (d)(i)** to work out an estimate for the total annual wage bill.

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

[Turn over

For Examiner's Use

4 The diagram is part of a map showing the position of two towns Anderro, *A*, and Bratena, *B*. The scale is 1 centimetre represents 10 kilometres.



Scale: 1 cm to 10 km

(a) Work out the distance, in kilometres, from Anderro to Bratena.

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

(b) Measure the bearing of Bratena from Anderro.

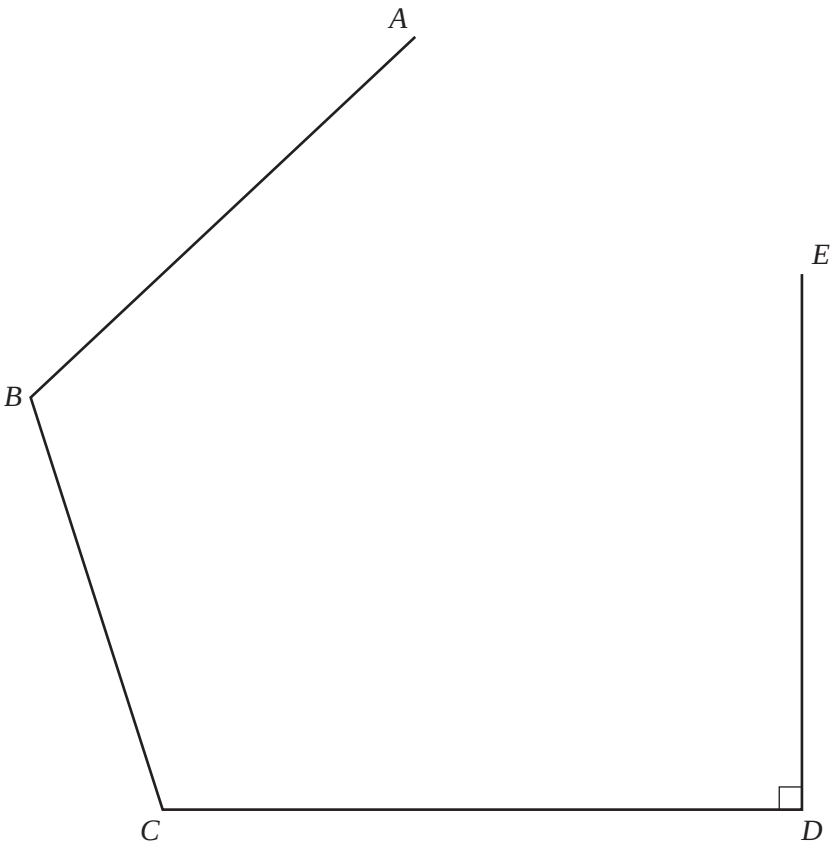
Answer (b) ..... [1]

(c) Carribon is 80 km from Anderro.
The bearing of Carribon from Anderro is 304°.

Mark the position of Carribon on the diagram. Label it *C*. [2]

5

For Examiner's Use



(a) In this part, all constructions must be completed using a straight edge and compasses only. All construction arcs must be clearly shown.

(i) Construct the perpendicular bisector of *DE*. [2]

(ii) Mark the midpoint of *DE* with the letter *M*. [1]

(iii) Construct the bisector of angle *BCD*.
Label the point, *F*, where this line crosses the line you have drawn in **part (a)(i)**. [2]

(iv) Write down the mathematical name of the quadrilateral *CDMF*.

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

(b) (i) Draw the locus of points which are 4 cm from *A*. [1]

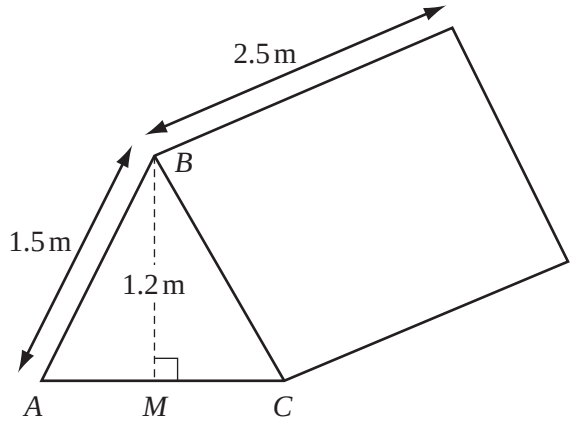
(ii) Draw the locus of points which are 3 cm from *E*. [1]

(iii) Shade the region which is less than 3 cm from *E* and more than 4 cm from *A*. [1]

[Turn over

For Examiner's Use

6 Finn is going camping.
The diagram shows his tent.



NOT TO SCALE

ABC is an isosceles triangle.
M is the midpoint of *AC*.
AB = 1.5 m and *BM* = 1.2 m.

(a) Show that *AM* = 0.9 m.

Answer(a)

[2]

(b) Use trigonometry to calculate angle *ABM*.

Answer(b) Angle *ABM* = ... [2]

For Examiner's Use

(c) The tent is a prism of length 2.5 m.
The area of triangle *ABC* is 1.08 m^2.

Calculate the volume of the tent.
Give the units of your answer.

Answer(c) .... [2]

(d) Calculate the surface area of the tent, including the base.

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

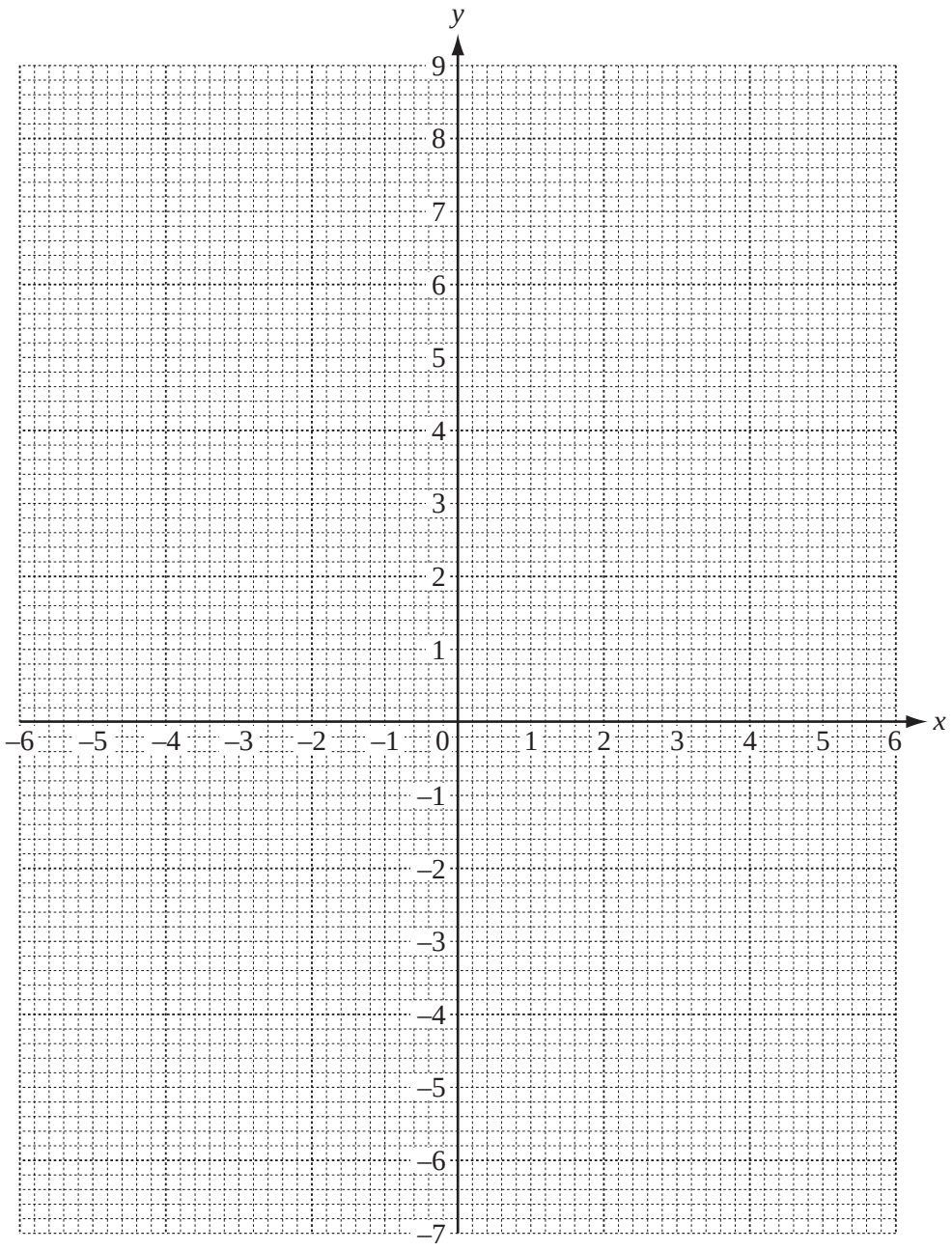
For Examiner's Use

7 **(a)** Complete the table of values for the function $y = x^2 - 5x + 2$.

x	–1	0	1	2	3	4	5
y			–2	–4	–4		2

[2]

(b) On the grid, draw the graph of $y = x^2 - 5x + 2$ for $-1 \leqslant x \leqslant 5$.



[4]

For Examiner's Use

(c) (i) Write down the co-ordinates of the lowest point of the graph of $y = x^2 - 5x + 2$.

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

(ii) On the grid, draw the line $y = -1$. [1]

(iii) Write down the x co-ordinates of the two points where $y = -1$ crosses the graph of $y = x^2 - 5x + 2$.

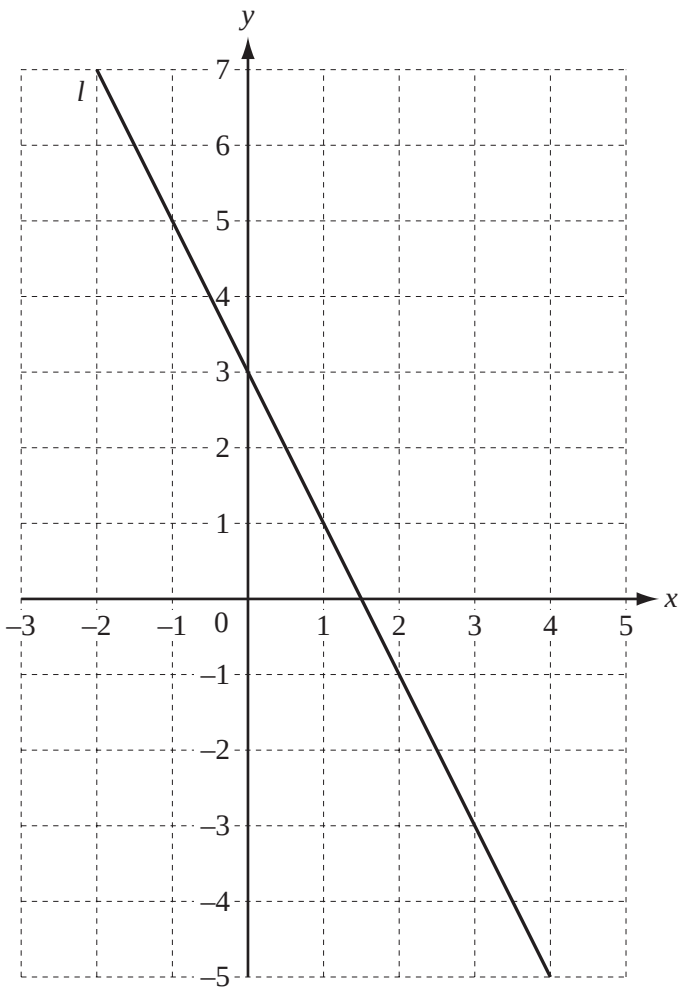
Answer(c)(iii) x = ... and x = ... [2]

(d) The point (5, 2) is reflected in the y-axis.

Write down the co-ordinates of the image of the point.

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

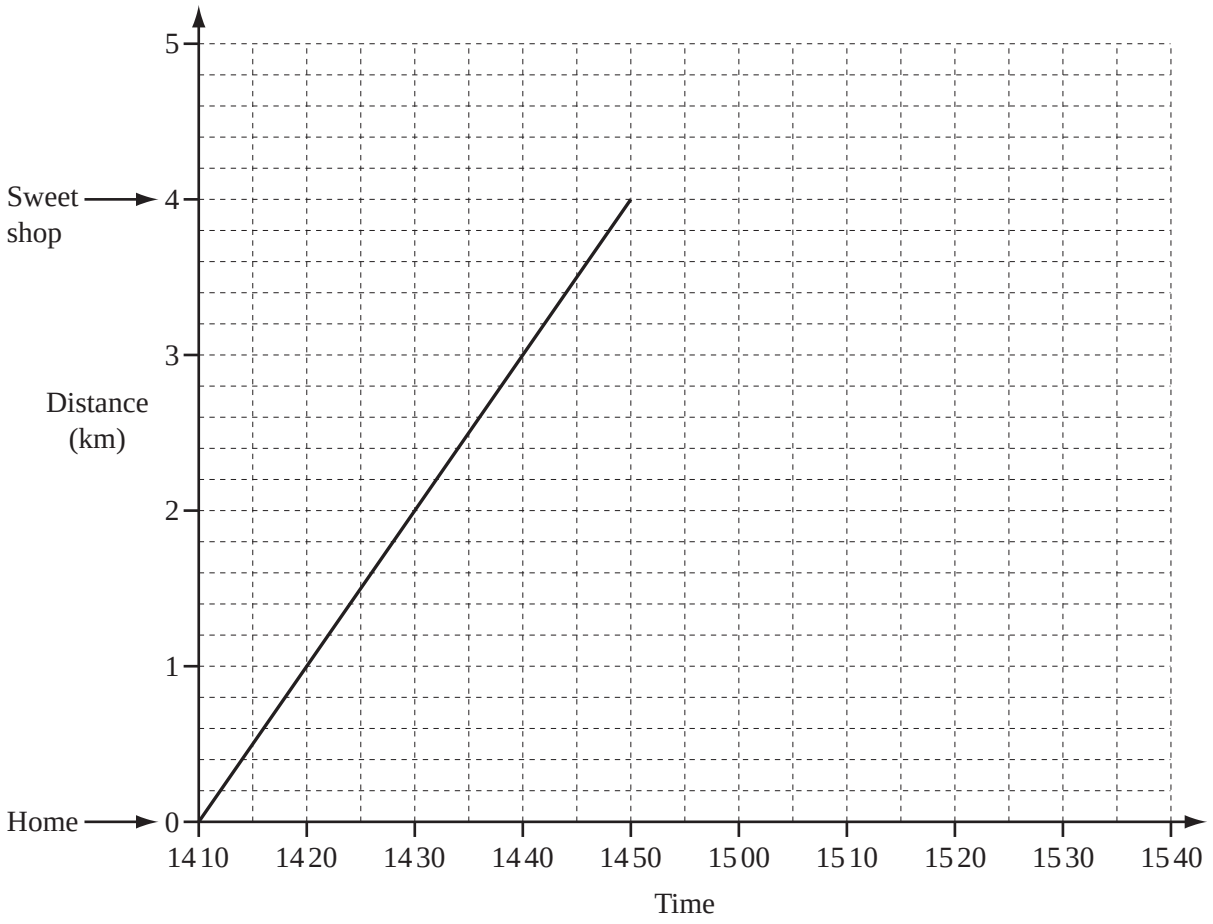
(e) Write down the equation of the line, l, drawn on the grid below.
Give your answer in the form $y = mx + c$.



Answer(e) y = ... [3]

For Examiner's Use

8



(a) Jono walked from his home to a sweet shop.

Use the travel graph to calculate his walking speed in kilometres per hour.

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

(b) Jono stayed in the sweet shop for 20 minutes.
He then ran home at a steady speed of 12 km/h.

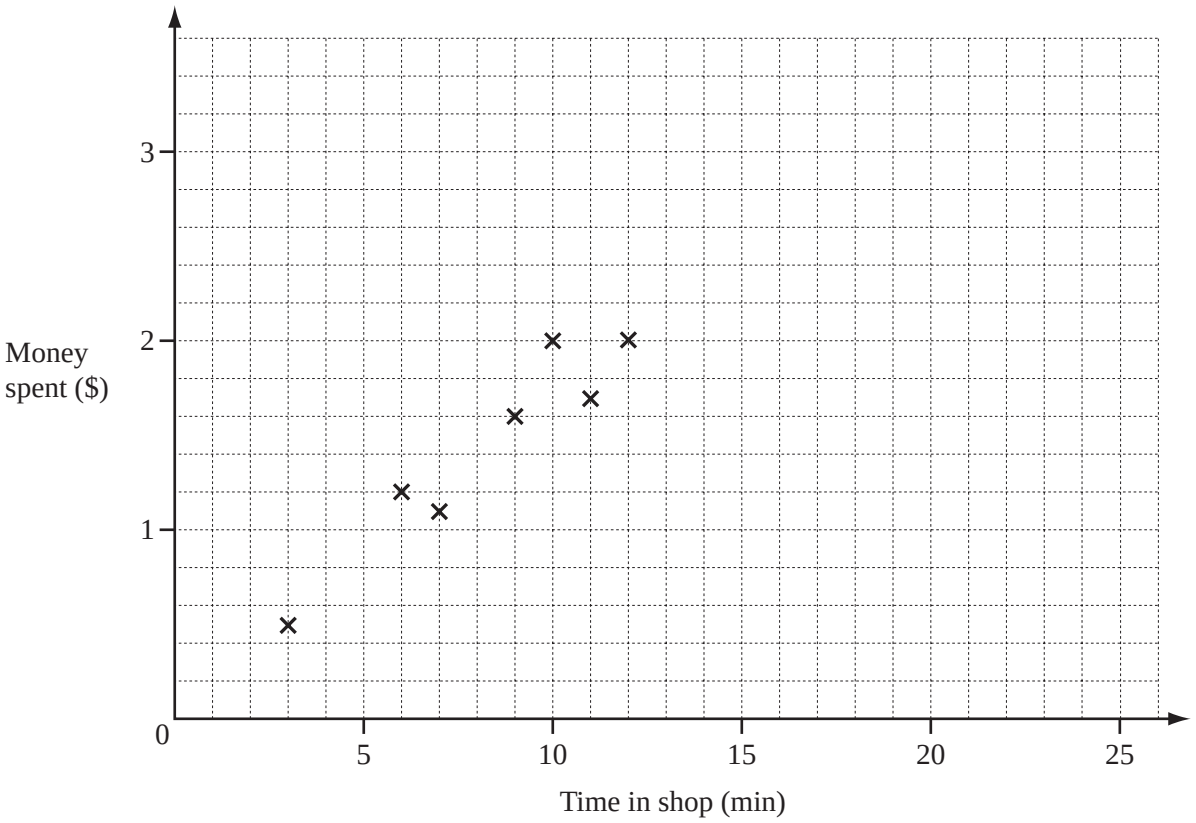
(i) On the grid above, complete the travel graph for Jono. [2]

(ii) Write down the time Jono arrived home.

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

(c) The sweet shop owner records how much time and how much money children spend in his shop.

Time in shop (min)	3	6	7	9	10	11	12	14	15	15	20
Money spent ($)	0.50	1.20	1.10	1.60	2.00	1.70	2.00	2.80	2.30	2.90	3.00



(i) Complete the scatter diagram.
The first seven points have been plotted for you. [2]

(ii) What type of correlation does this scatter diagram show?

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

(iii) On the grid, draw the line of best fit. [1]

(iv) A child spent $2.50 in the shop.
Use your line of best fit to estimate how long the child was in the shop.

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

For Examiner's Use

9 A family of 2 adults and 3 children are on holiday.
They each hire a mountain bike from the hotel.

Large mountain bike		Small mountain bike	
First hour	Each extra hour	First hour	Each extra hour
\$6	\$2	\$3.60	\$1.20

(a) The family hire 2 large and 3 small mountain bikes for 5 hours.

(i) Work out the total cost.

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

(ii) The hotel gives the family a discount of 15% on the total cost.
Work out how much the family pays.

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

(b) A wheel of a large bike has a radius of 32 cm.

(i) Calculate the circumference of a wheel of a large bike.

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

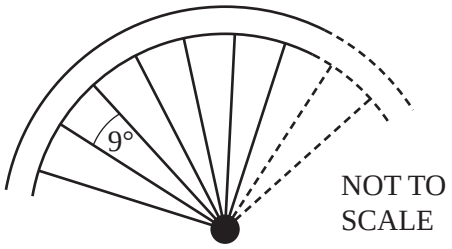
For Examiner's Use

(ii) The family cross a bridge which is 24 m long.

Calculate how many **complete** turns a wheel of a large bike makes to cross the bridge.

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

(c) The diagram shows part of a wheel of a large bike. There is an angle of 9° between two metal spokes. Each spoke is 29 cm long.



Calculate the total length of metal, in metres, needed to make the spokes for one wheel.

Answer(c) ..... m [3]

Question 10 is printed on the next page.

For Examiner's Use

10 (a) (i) Find the highest common factor (HCF) of 24 and 36.

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

(ii) Factorise.

$24x + 36y$

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

(b) Simplify.

(i) $w + 8k - 5w + 2k$

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

(ii) $(x^4)^5$

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

(c) Here are the first four terms of a sequence.

7 11 15 19

Find the nth term of this sequence.

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

(d) Solve the simultaneous equations.

$$3x + y = 8$$
$$x + 5y = 5$$

Answer(d) $x =$ .....

$y =$ ..... [3]