UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

3681151018

MATHEMATICS **0581/32**

Paper 3 (Core) **May/June 2011**

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.

UNIVERSITY of CAMBRIDGE International Examinations

For Examiner's Use

1 Falla buys 3000 square metres of land for a house and garden.
The garden is divided into areas for flowers, vegetables and grass.

He divides the land in the following ratio.

house : flowers : vegetables : grass = 4 : 7 : 8 : 5

(a) (i) Show that the area of land used for flowers is 875 m^2.

Answer(a)(i)

[2]

(ii) Calculate the area of land used for the house.

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

(b) Write down the fraction of land used for vegetables.
Give your answer in its simplest form.

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

(c) During the first year Falla plants flowers in 64% of the 875 m^2.

Calculate the area he plants with flowers.

For Examiner's Use

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

(d) Falla sells some of the vegetables he grows.
These vegetables cost \$85 to grow.
He sells them for \$105.

Calculate his percentage profit.

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

(e) To buy the land Falla borrowed \$5000 at a rate of 6.4% **compound** interest for 2 years.

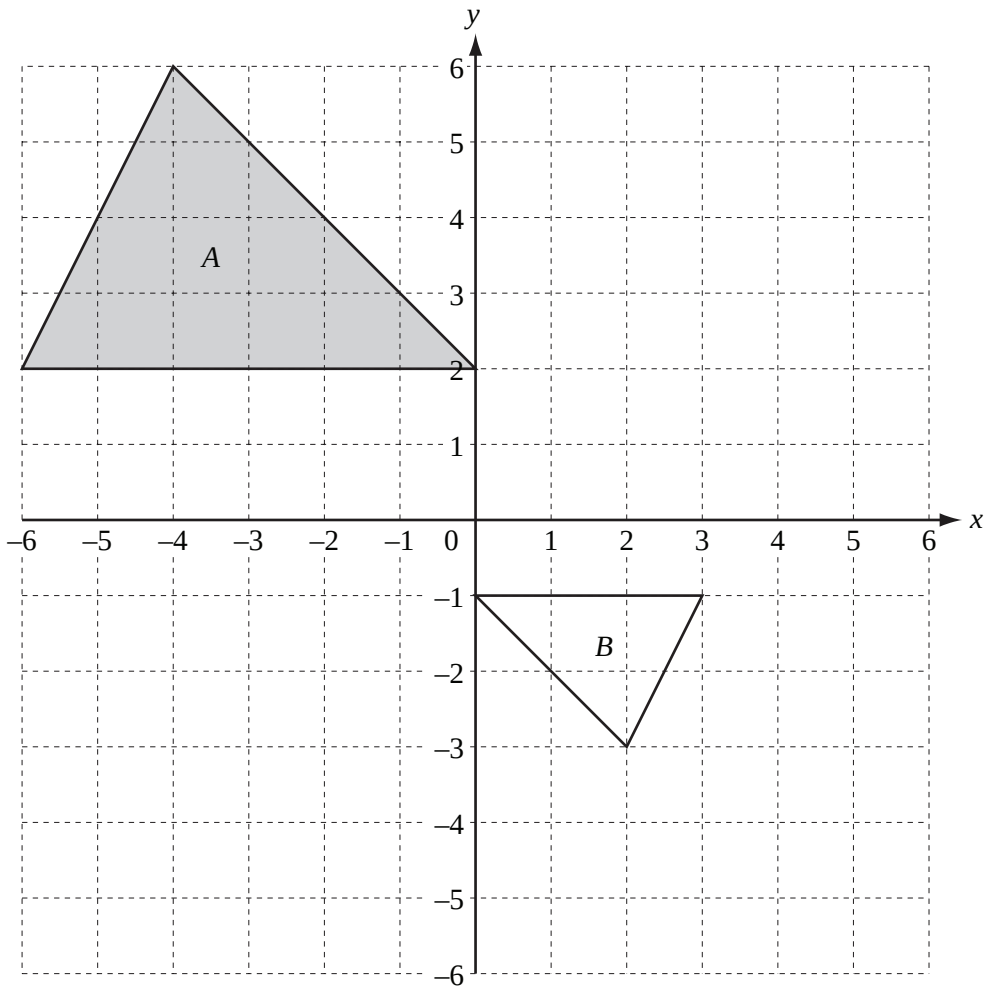
Calculate the **total** amount he pays back at the end of the 2 years.
Give your answer correct to the nearest dollar.

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

[Turn over

2

For Examiner's Use



The diagram shows two triangles drawn on a 1 cm square grid.

(a) **(i)** Describe fully the **single** transformation which maps triangle *A* onto triangle *B*.

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

(ii) Calculate the area of triangle *A*.

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

(iii) Find the perimeter of triangle *A*.

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

(b) Reflect triangle *A* in the *x*-axis.
Label the image *P*. [1]

(c) Rotate triangle *A* through 90° clockwise about (0, 0).
Label the image *Q*. [2]

(d) Describe fully the **single** transformation which maps triangle *P* onto triangle *Q*.

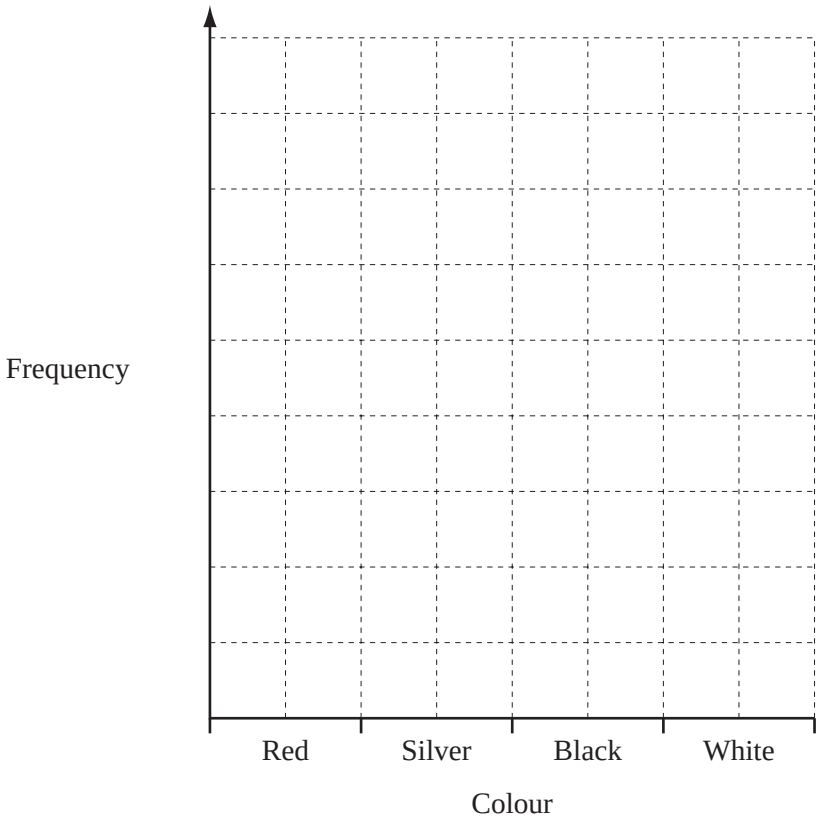
Answer(d) ..... [2]

For Examiner's Use

3 The colours of 30 cars in a car park are shown in the frequency table.

Colour	Frequency
Red	5
Silver	15
Black	6
White	4

(a) Complete the bar chart to represent this information.



[3]

(b) Write down the mode.

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

For Examiner's Use

4 **(a)** An electrician is paid a fixed amount of \$12 and then \$6.50 for each hour she works.

(i) The electrician works for 7 hours.

Calculate how much she is paid for this work.

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

(ii) The electrician works for n hours.

Write down an expression, in terms of n, for how much she is paid.

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

(iii) The electrician is paid \$44.50 for her work.

Calculate the number of hours she worked.

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

(b) Solve the simultaneous equations.

$$3x - y = 22$$
$$5x + 3y = 4$$

Answer(b) x = ...

y = ... [3]

For Examiner's Use

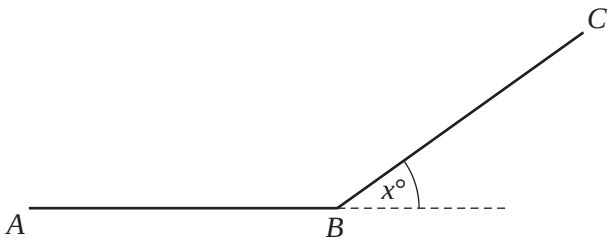
5 **(a)** The table below shows how many sides different polygons have.

Complete the table.

Name of polygon	Number of sides
	3
Quadrilateral	4
	5
Hexagon	6
Heptagon	7
	8
Nonagon	9

[3]

(b) Two sides, *AB* and *BC*, of a regular nonagon are shown in the diagram below.



NOT TO SCALE

(i) Work out the value of *x*, the exterior angle.

Answer(b)(i) $x =$ ..... [2]

(ii) Find the value of angle *ABC*, the interior angle of a regular nonagon.

Answer(b)(ii) Angle *ABC* = ... [1]

For Examiner's Use

6 The number of ice-creams sold in a shop each month is shown in the table.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Number of ice-creams sold	1300	1200	1700	1800	2300	2500	2800	2600	1500	1600	1100	1900

(a) (i) Find the range.

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

(ii) Calculate the mean.

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

(iii) Find the median.

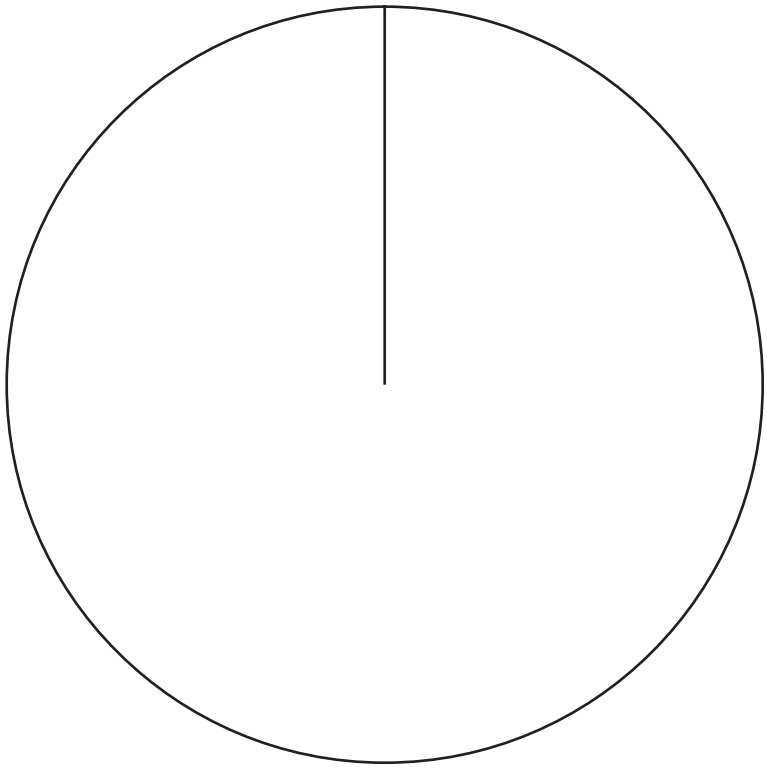
Answer(a)(iii) ..... [2]

(b) The numbers of chocolate, strawberry and vanilla ice-creams sold are shown in the table.

Flavour	Number of ice-creams	Pie chart sector angle
Chocolate	4200	140°
Strawberry	3600	
Vanilla	3000	

(i) Complete the table by working out the sector angles for strawberry and vanilla. [3]

(ii) Complete the pie chart below and label the sectors.

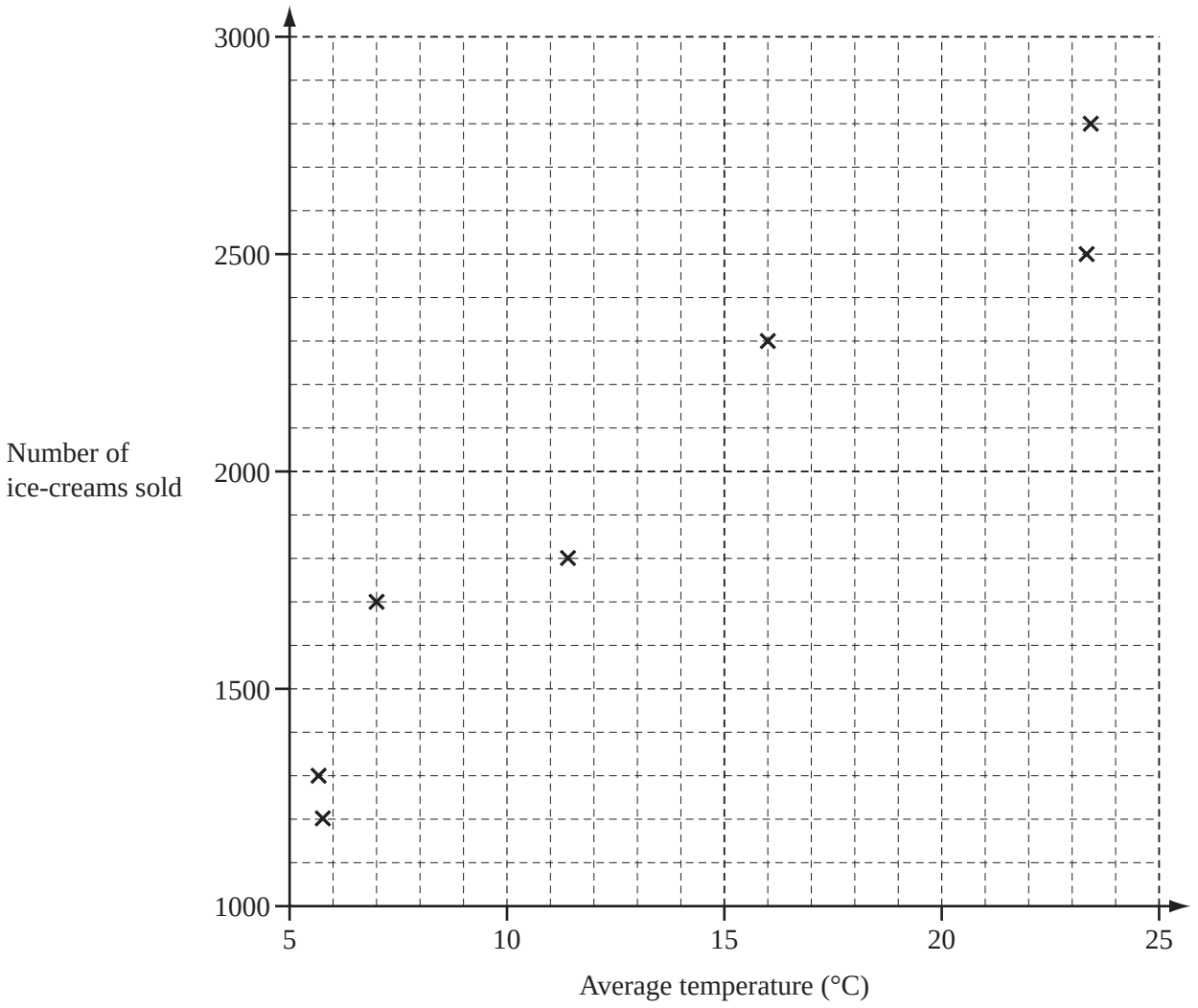


[2]

(c) The table shows the average temperature and the number of ice-creams sold each month.

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Temperature (°C)	5.6	5.7	7.0	11.4	16.0	23.3	23.4	20.0	15.5	11.5	8.0	14.0
Number of ice-creams sold	1300	1200	1700	1800	2300	2500	2800	2600	1500	1600	1100	1900

(i) Complete the scatter diagram for the months August to December.
The points for January to July are plotted for you.



[2]

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

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

(iii) Write down a statement connecting the number of ice-creams sold to the average monthly temperature.

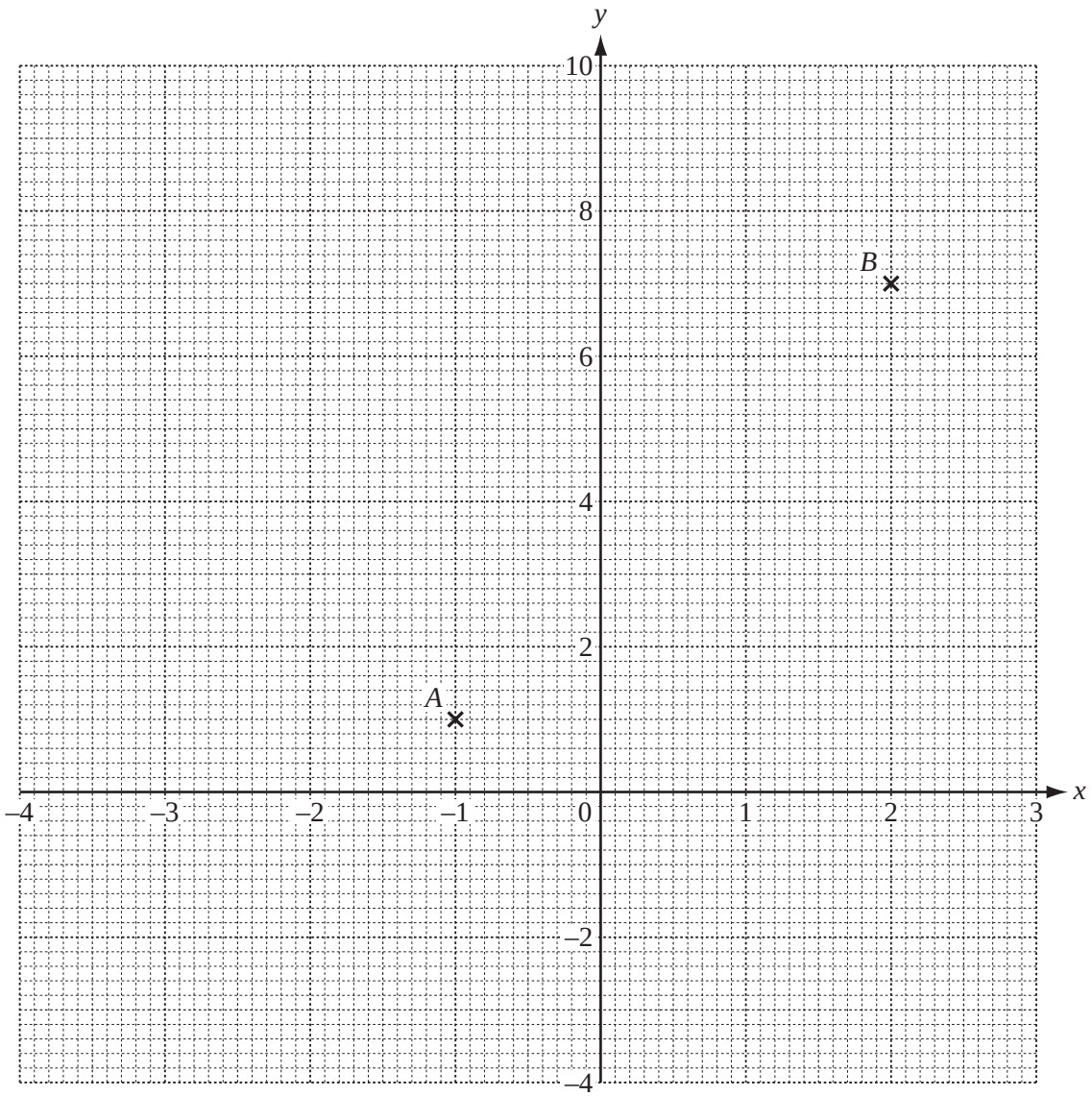
Answer(c)(iii) ..... [1]

7 **(a)** The table shows some values of the function $y = x^2 + x - 3$.

x	-4	-3	-2	-1	0	1	2	3
y	9	3		-3		-1		9

(i) Complete the table. [2]

(ii) On the grid, draw the graph of $y = x^2 + x - 3$ for $-4 \leqslant x \leqslant 3$.



[4]

(iii) Use your graph to solve the equation $x^2 + x - 3 = 0$.

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

(b) **(i)** Draw the line of symmetry of the graph. [1]

(ii) Write down the equation of the line of symmetry.

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

(c) Two points, A and B, are marked on the grid.

(i) Draw the straight line through the points A and B extending it to the edges of the grid. [1]

(ii) Write down the co-ordinates of the points of intersection of this line with $y = x^2 + x - 3$.

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

(iii) Work out the gradient of the straight line through points A and B.

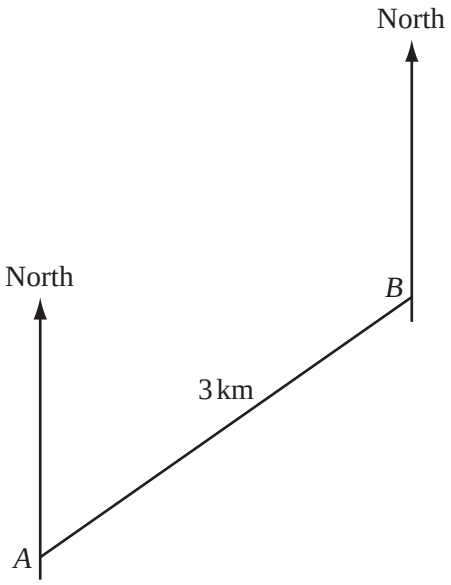
Answer(c)(iii) ..... [2]

(iv) Write down the equation of the straight line through points A and B, in the form $y = mx + c$.

Answer(c)(iv) $y =$ ..... [2]

For Examiner's Use

8 Manuel rows his boat from A to B, a distance of 3 kilometres.
The scale diagram below shows his journey.
1 centimetre represents 0.5 kilometres.



(a) (i) Measure the bearing of B from A.

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

(ii) The journey from A to B takes him 30 minutes.

Calculate his average speed in kilometres per hour.

Answer(a)(ii) ..... km/h [1]

(b) From B, Manuel rows 3.5 kilometres in a straight line, on a bearing of 145°, to a point C.

On the diagram, draw accurately this journey and label the point C. [2]

(c) Manuel then rows from C to A.

(i) Measure CA.

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

(ii) Work out the **actual** distance from C to A.

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

(iii) By measuring a suitable angle, find the bearing of A from C.

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

(d) Two buoys, P and Q, are on opposite sides of the line AB.
Each buoy is 2 km from A and 1.5 km from B.

(i) On the diagram, construct and mark the positions of P and Q. [2]

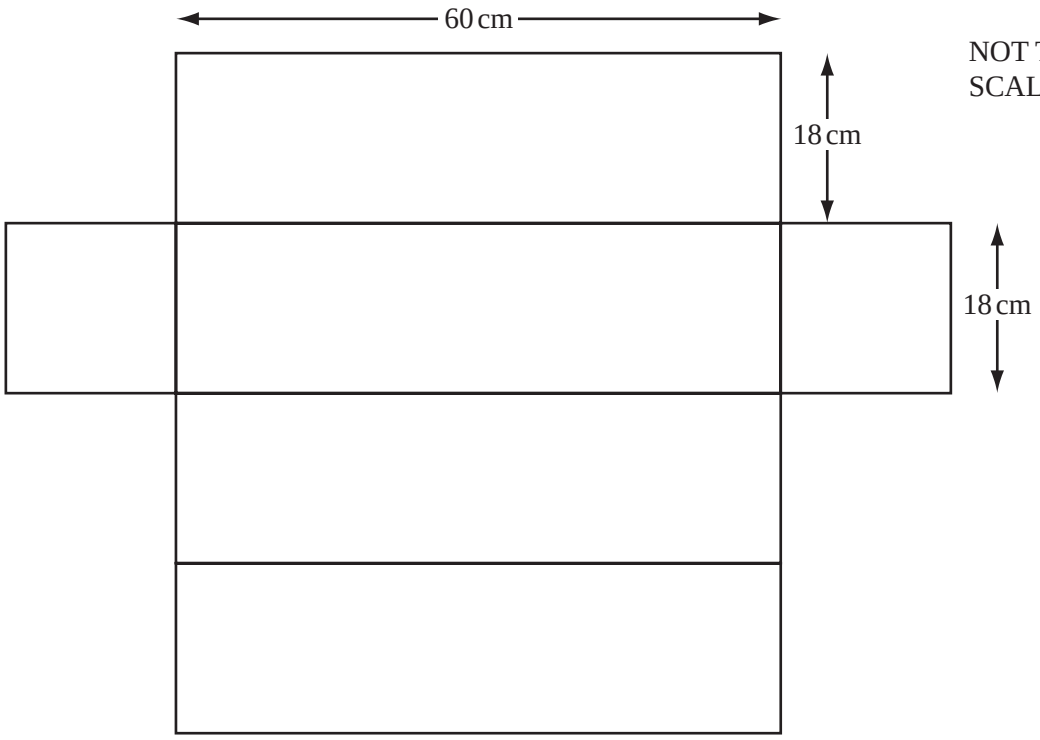
(ii) Measure the distance between P and Q.

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

(iii) Find the **actual** distance, PQ, in kilometres.

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

9



The diagram shows the net of a box.

(a) (i) Calculate the **total** surface area of the box.

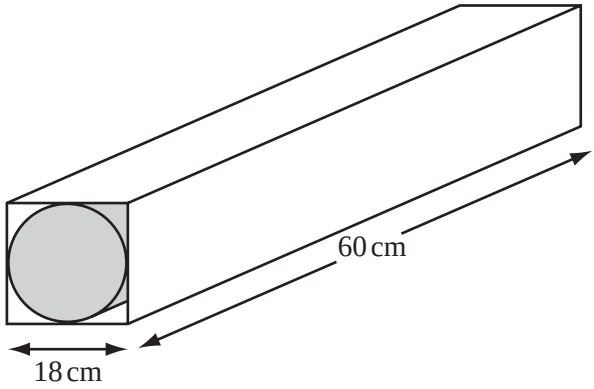
Answer(a)(i) ..... cm^2 [2]

(ii) Calculate the volume of the box.

Answer(a)(ii) ..... cm^3 [2]

For Examiner's Use

(b) A cylinder with **diameter** 18 cm and length 60 cm just fits inside the box.



NOT TO SCALE

(i) Calculate the volume of the cylinder.

Answer(b)(i) ..... cm^3 [2]

(ii) Find the volume of space outside the cylinder but inside the box.

Answer(b)(ii) ..... cm^3 [1]

(iii) Calculate the curved surface area of the cylinder.

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

Question 10 is printed on the following page.

For Examiner's Use

10 **(a)** Write down the next two terms in each of the following sequences.

(i) 71, 64, 57, 50, ..., ... [1]

(ii) −17, −13, −9, −5, ..., ... [2]

(b) The nth term of the sequence in **part (a)(i)** is $78 - 7n$.

Find the value of the 15th term.

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

(c) Write down an expression for the nth term of the sequence in **part (a)(ii)**.

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

(d) For one value of n, both sequences in **part (a)** have a term with the same value.

Use **parts (b) and (c)** to find

(i) the value of n,

Answer(d)(i) n = ... [2]

(ii) the value of this term.

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