



UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE
NAME

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MATHEMATICS (US)

0444/33

Paper 3 (Core)

October/November 2012

2 hours

Candidates answer on the Question Paper.

Additional Materials: Electronic calculator
 Geometrical instruments

READ THESE INSTRUCTIONS FIRST

Write your Center 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 work is needed for any question it must be shown in the space provided.

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 digits. Give answers in degrees to one decimal place.

For π , use either your calculator value or 3.142.

The number of points is given in parentheses [] at the end of each question or part question.

The total of the points for this paper is 104.

Write your calculator model in the box below.

This document consists of **17** printed page and **3** blank pages.



Formula List

Area, A , of triangle, base b , height h .

$$A = \frac{1}{2}bh$$

Area, A , of circle, radius r .

$$A = \pi r^2$$

Circumference, C , of circle, radius r .

$$C = 2\pi r$$

Lateral surface area, A , of cylinder of radius r , height h .

$$A = 2\pi rh$$

Surface area, A , of sphere of radius r .

$$A = 4\pi r^2$$

Volume, V , of prism, cross-sectional area A , length l .

$$V = Al$$

Volume, V , of cylinder of radius r , height h .

$$V = \pi r^2 h$$

Volume, V , of sphere of radius r .

$$V = \frac{4}{3}\pi r^3$$

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- 1 (a) Angelica goes to watch a soccer match.
She entered the stadium at 19 20 and left at 22 05.

Work out the number of hours and minutes she was in the stadium.

Answer(a) hours minutes [1]

- (b) The number of people watching the soccer match was 25 926.

Write 25 926 correct to the nearest thousand.

Answer(b) [1]

- (c) The soccer club buys lemonade in 5 liter bottles.

Work out the number of 250 milliliter drinks that can be poured from one bottle.



Answer(c) [2]

- (d) The list shows the total number of points scored by Mathsletico Rangers for the last 8 seasons.

15 28 30 35 45 60 72 75

From the list, write down

- (i) two numbers that have a common factor of 30,

Answer(d)(i) and [1]

- (ii) a common multiple of 8 and 36,

Answer(d)(ii) [1]

- (iii) the least common multiple (LCM) of 15 and 20.

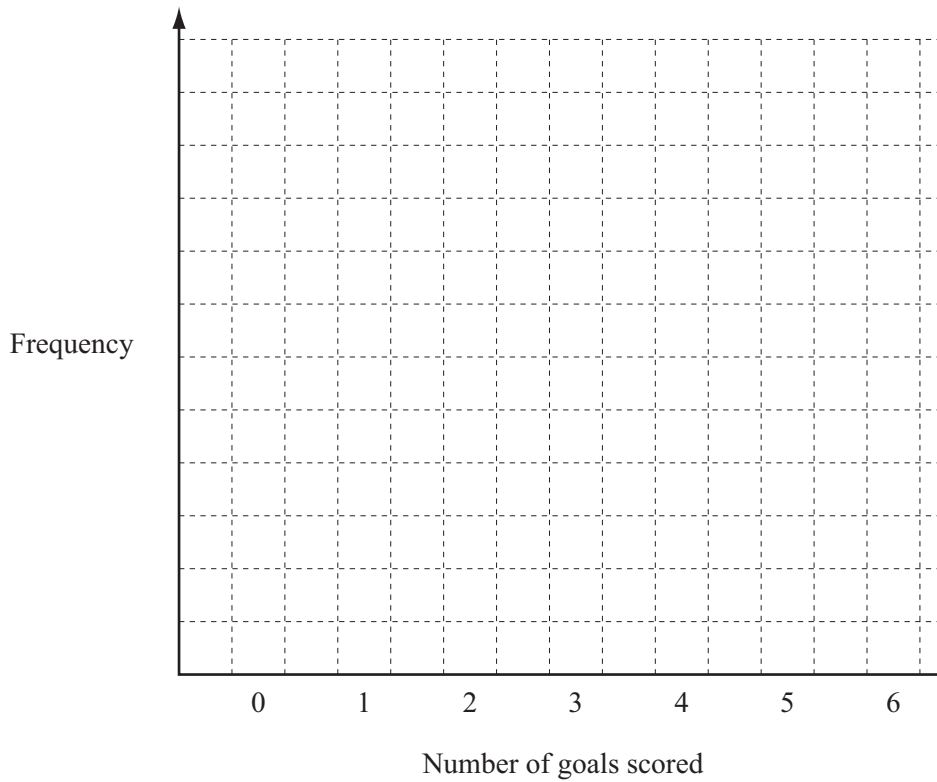
Answer(d)(iii) [1]

(e) The table shows the number of goals scored in each match by Mathsletico Rangers.

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Number of goals scored	Number of matches
0	4
1	11
2	6
3	3
4	2
5	1
6	2

(i) Draw a bar chart to show this information.
Complete the scale on the frequency axis.



(ii) Write down the mode.

[3]

Answer(e)(ii) [1]

- 2 (a) (i) Helva and her husband are flying from Finland to India.
Their plane takes off at 17 00 and arrives in India 7 hours 25 minutes later.
The time in India is $3\frac{1}{2}$ hours ahead of the time in Finland.
What is the local time in India when the plane arrives?

Answer(a)(i) [2]

- (ii) The temperature is -3°C in Finland and 23°C in India.

Write down the difference between these two temperatures.

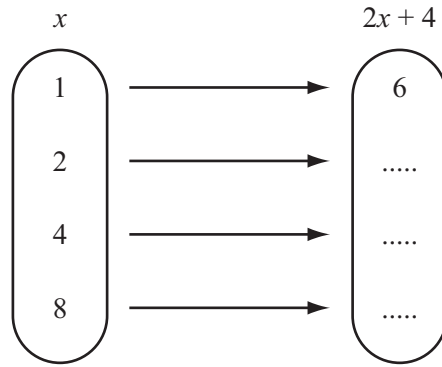
Answer(a)(ii) $^{\circ}\text{C}$ [1]

- (b) Helva exchanged 7584 rupees for euros (€).
The exchange rate was $1\text{€} = 56$ rupees.

How many euros did Helva receive?
Give your answer correct to 2 decimal places.

Answer(b) € [2]

3 (a)



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(i) Complete the mapping diagram for the function $f: x \rightarrow 2x + 4$. [2]

(ii) Using the mapping diagram, write down the domain for this function.

Answer(a)(ii) [1]

(b) A wooden packing crate contains x identical items.
Each of these items has a mass of 5 kg.
The empty packing crate has a mass of 25 kg.

$T(x)$ represents the total mass of the wooden crate containing x identical items.

(i) Write down an expression, in terms of x , for the function $T(x)$.

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

(ii) The wooden packing crate holds at most 5 of these items.

Find the **range** of $T(x)$.

Answer(b)(ii) [2]

4 Mrs Ali sold her house for \$600 000.

(a) She gives $\frac{2}{5}$ of the money to her son.

Work out how much her son receives.

Answer(a) \$ [1]

(b) Mrs Ali gives \$2400 to her grandchildren Elize, Sam and Juan in the ratio

Elize : Sam : Juan = 8 : 3 : 5 .

Calculate how much they each receive.

Answer(b) Elize \$

Sam \$

Juan \$ [3]

(c) Mrs Ali invests \$200 000 for 3 years at a rate of 4% per year compound interest.

Calculate the total amount of money she will have at the end of the 3 years.

Give your answer correct to the nearest dollar.

Answer(c) \$ [3]

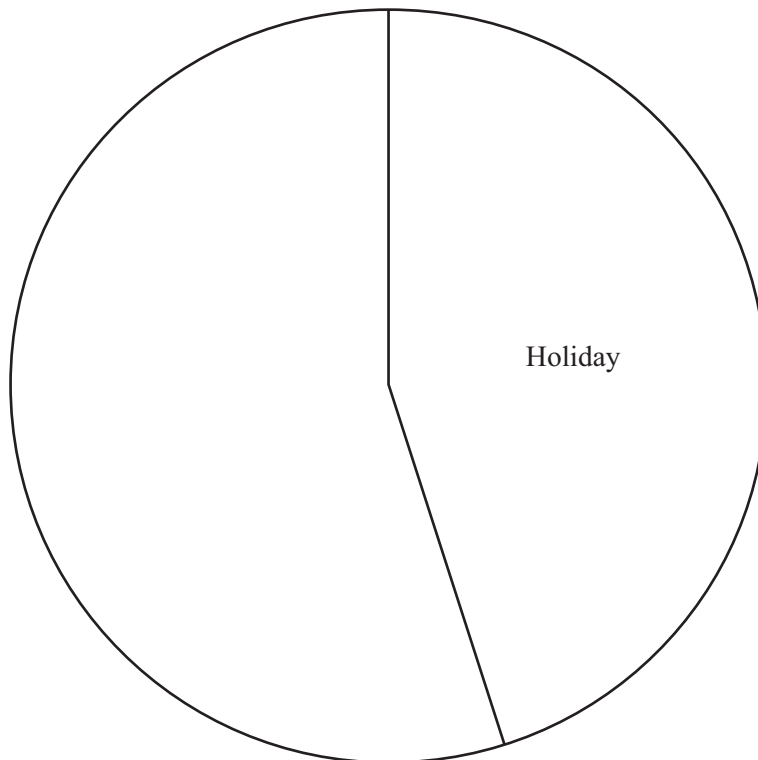
(d) Mrs Ali spends a total of \$9000 on the following items.

	Amount spent (\$)	Angle in pie chart
Holiday	4050	162°
Television		90°
Clothes	1800	72°
Computer		

(i) Complete the table.

[3]

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



[2]

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5 (a) Solve the following equations.

(i) $6x - 2 = 2x + 8$

Answer(a)(i) $x =$ [2]

(ii) $4(2y - 3) = 24$

Answer(a)(ii) $y =$ [3]

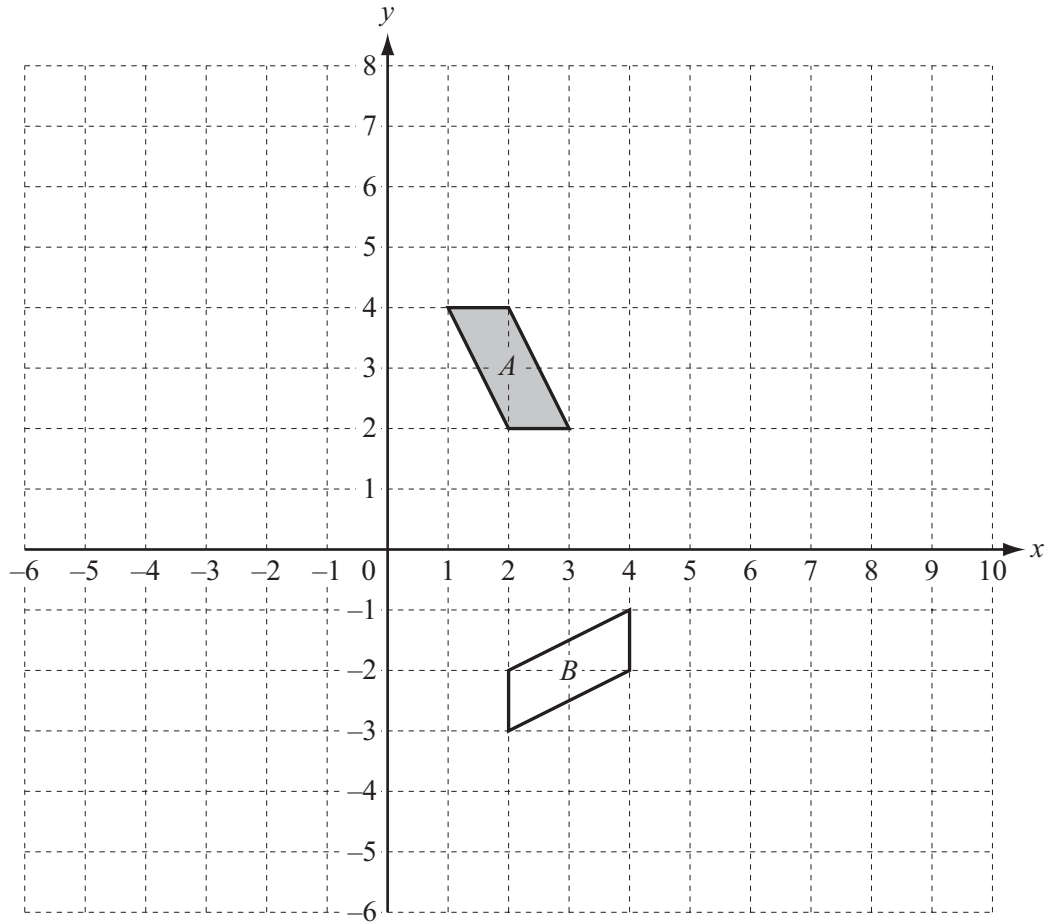
(b) Solve the system of linear equations.

$$\begin{aligned}5x + 9y &= -21 \\12x - 2y &= 44\end{aligned}$$

Answer(b) $x =$
 $y =$ [4]

6

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(a) What special type of quadrilateral is shape *A*?

Answer(a) [1]

(b) Describe fully the **single** transformation which maps shape *A* onto shape *B*.

Answer(b) [3]

(c) On the grid

(i) reflect shape *A* in the *y*-axis and label the image *C*, [2]

(ii) translate shape *A* by $\begin{pmatrix} -6 \\ -4 \end{pmatrix}$ and label the image *D*, [2]

(iii) enlarge shape *A* by scale factor 2, with centre (0, 0) and label the image *E*. [2]

7 (a) These are the first four terms of a sequence.

19 15 11 7

(i) Write down the next two terms of this sequence.

Answer(a)(i) and [2]

(ii) Write down the rule for finding the next term of this sequence.

Answer(a)(ii) [1]

(iii) Find an expression for the n th term of this sequence.

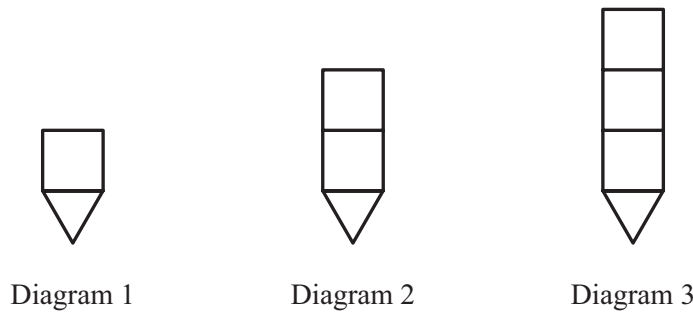
Answer(a)(iii) [2]

(b) The n th term of another sequence is $2n + 6$.

Write down the first three terms of this sequence.

Answer(b) , , [2]

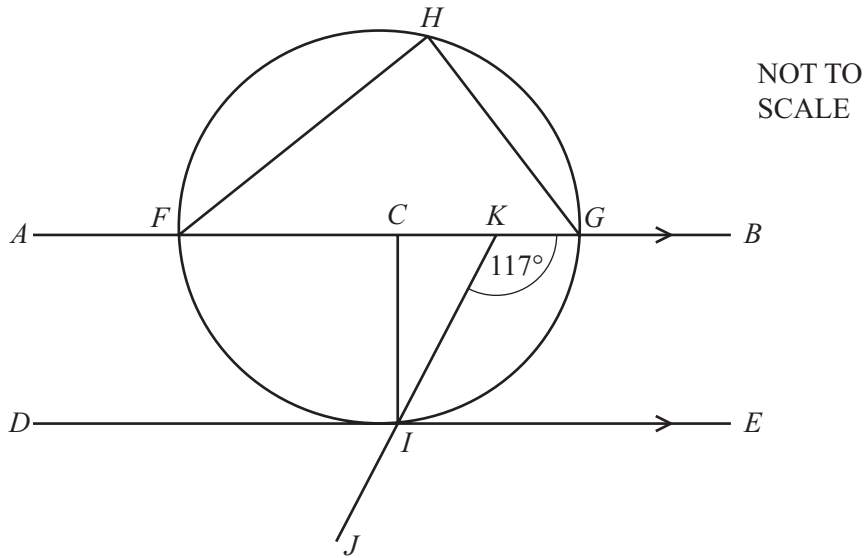
(c) The first three diagrams of a different sequence are shown below.



Complete the table.

Diagram	1	2	3		8		n
Number of lines	6	9	12				

[3]



The points F , G , H and I lie on a circle, center C .
 FG is a diameter and DE is a tangent to the circle at I .
 DE is parallel to AB and angle $GKI = 117^\circ$.

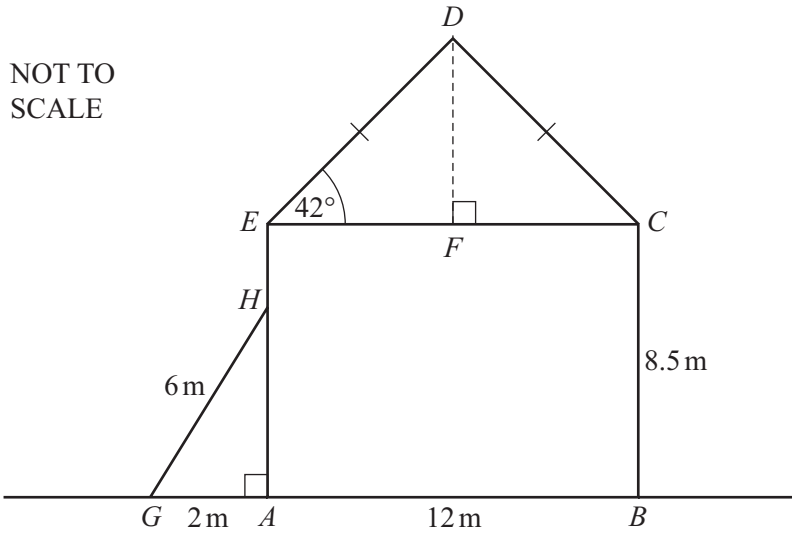
Complete the following statements.

(a) Angle $FKI =$ because
 [2]

(b) Angle $FHG =$ because
 [2]

(c) Angle $EIJ =$ because
 [2]

(d) Angle $CIE =$ because
 [2]



The diagram shows a house, built on level ground.
 $ABCE$ is a rectangle with $AB = 12\text{ m}$ and $BC = 8.5\text{ m}$.
 CDE is an isosceles triangle.

(a) Use trigonometry to calculate DF .

Answer(a) $DF = \dots\dots\dots\text{ m}$ [2]

(b) Calculate the area of triangle CDE .

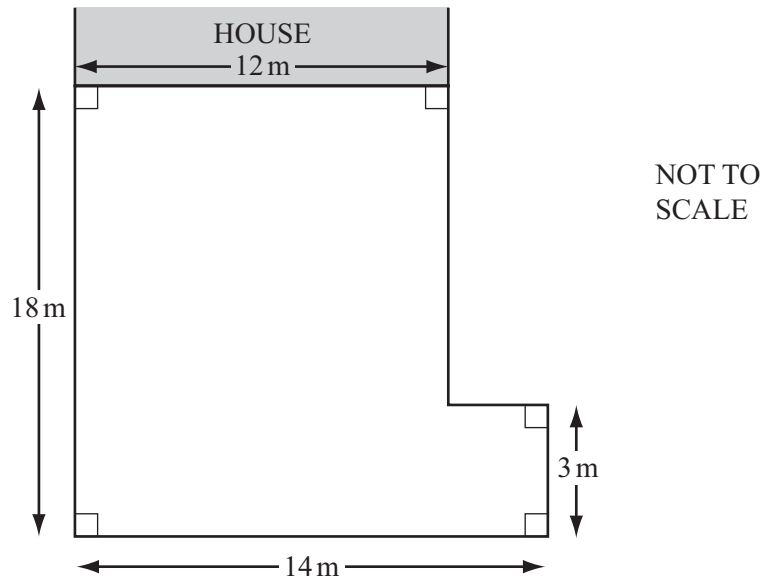
Answer(b) $\dots\dots\dots\text{ m}^2$ [2]

(c) A ladder, GH , of length 6 m , leans against the house wall.
 The foot of the ladder is 2 m from this wall.

Calculate AH .

Answer(c) $AH = \dots\dots\dots\text{ m}$ [3]

- (d) This diagram shows the plan of the driveway to the house.



Work out the perimeter of the driveway.

Answer(d) m [2]

- (e) The driveway is made from concrete.
The concrete is 15 cm thick.

Calculate the volume of concrete used for the driveway.
Give your answer in cubic meters.

Answer(e) m³ [4]

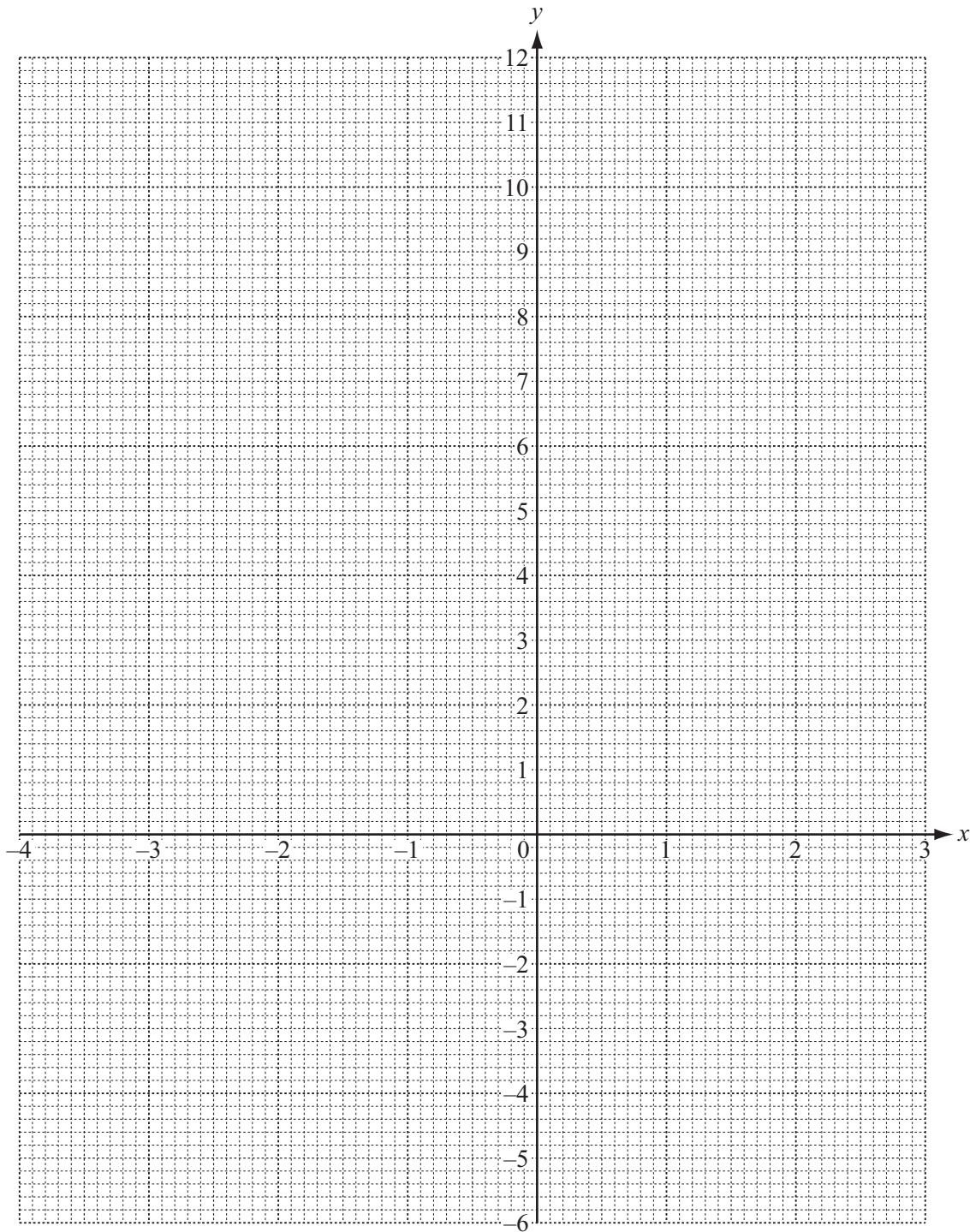
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- 10 (a) Complete the table of values for $y = x^2 + 2x - 4$.

x	-4	-3	-2	-1	0	1	2	3
y	4		-4		-4			11

[3]

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



[4]

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- (c) (i) Draw the line of symmetry on the graph. [1]
- (ii) Write down the equation of this line of symmetry.

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Answer(c)(ii) [1]

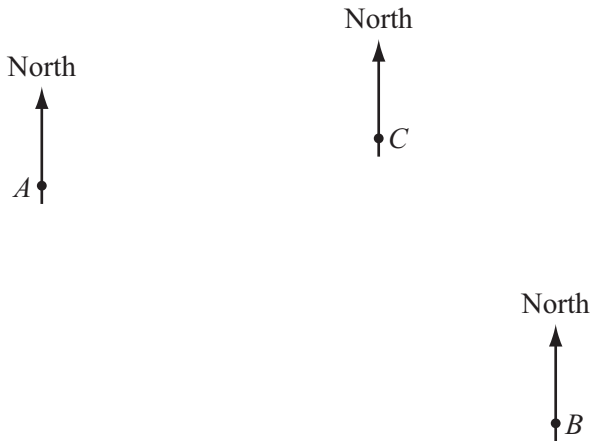
- (d) Use your graph to solve the equation $x^2 + 2x - 4 = 3$

Answer(d) $x =$ or $x =$ [2]

Question 11 is printed on the next page.

- 11 (a) The diagram shows the positions of three towns A , B and C .
The scale is 1 cm represents 2 km.

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Scale: 1 cm = 2 km

- (i) Find the distance in kilometres from A to B .

Answer(a)(i) km [2]

- (ii) Town D is 9 km from A on a bearing of 135° .
Mark the position of town D on the diagram. [2]

- (b) The population of town C is 324 100.

- (i) Write this number in scientific notation.

Answer(b)(i) [1]

- (ii) The population of town D is 7.64×10^4 .

Which town, C or D , has the larger population and by how much?
Give your answer in scientific notation.

Answer(b)(ii) Town by [3]

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