UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER

CANDIDATE NUMBER

0871794379

MATHEMATICS **0580/31**

Paper 3 (Core) **October/November 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 **15** printed pages and **1** blank page.

For Examiner's Use

1 Pedro is on a cruise ship.

(a) The ship has a climbing wall.
These are the number of attempts that each of 30 people made at climbing the wall.

29	27	11	3	12	4	29	9	16	17	30	29	38	36	18
2	15	24	36	3	33	26	21	9	38	4	28	23	19	27

(i) Find the range.

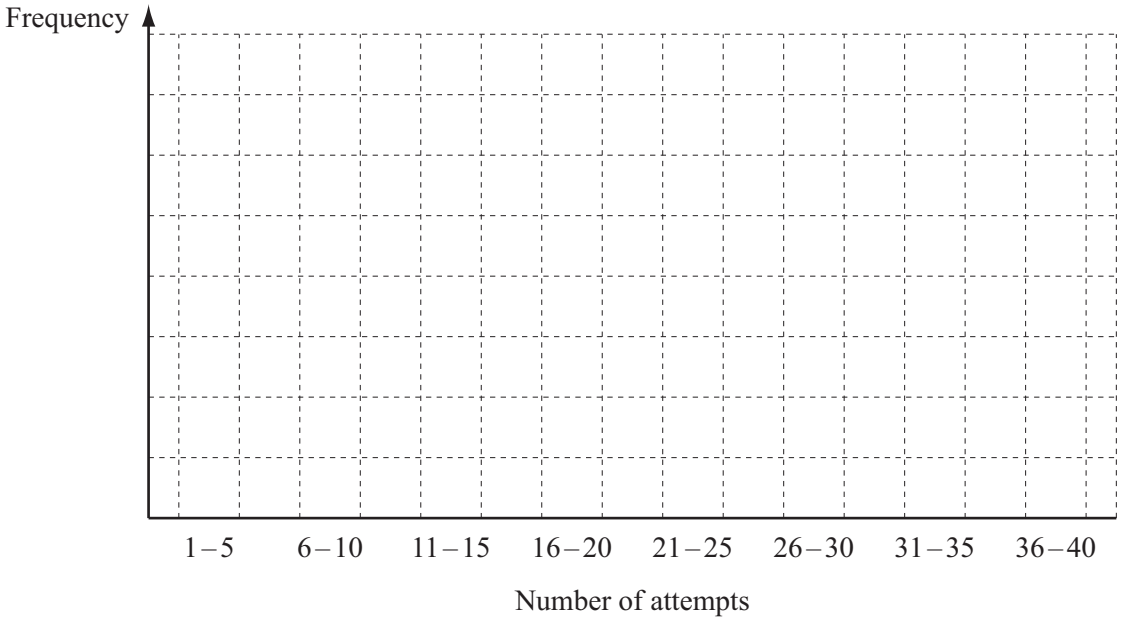
Answer(a)(i) ..... [1]

(ii) Complete the frequency table.
You may use the tally column to help you.

Number of attempts	Tally	Frequency
1–5		
6–10		
11–15		
16–20		
21–25		
26–30		
31–35		
36–40		

[2]

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



[3]

(iv) Write down the modal group.

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

(b) Pedro left the ship in Cadiz at 08 45.
He returned to the ship at 16 10.
Find how long Pedro was in Cadiz.

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

(c)

Exchange Rate
$1 = €1.428

(i) Pedro changed $167 into euros (€).

Calculate how many euros Pedro received.
Give your answer correct to 2 decimal places.

Answer(c)(i) € ..... [2]

(ii) Later, Pedro changed €107.10 back into dollars ($) using the same exchange rate.

Calculate how many dollars Pedro received.

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

[Turn over

For Examiner's Use

2 **(a)** **(i)** 1 and 120 are factors of 120.

Write down another factor of 120.

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

(ii) Find the highest common factor of 120 and 900.

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

(b) 2 5 15 24 49 60 258 512

From the list, write down

(i) a multiple of 30,

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

(ii) a square number,

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

(iii) the cube root of 8.

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

(c) Give an example to show that the following statements are **not** true.

(i) An odd number multiplied by an even number gives an odd number.

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

(ii) The cube of a negative number is positive.

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

(d) Use $<$, $>$, or $=$ to complete the following statements.
Each symbol may be used more than once.

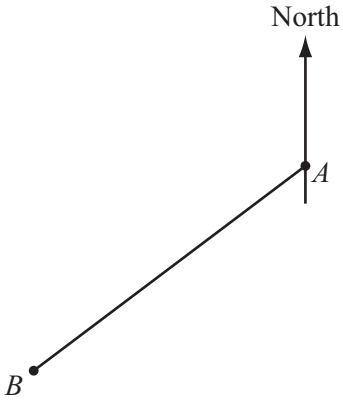
(i) 0.5 ..... $\frac{3}{8}$ [1]

(ii) 1.5 ..... 105% [1]

(iii) 0.78 ..... $\frac{11}{14}$ [1]

For Examiner's Use

3 **(a)** The diagram shows the position of town *A* and town *B*, on a map.



(i) Measure the length, in millimetres, of the line *AB*.

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

(ii) Measure the bearing of town *B* from town *A*.

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

(b) A triangular field has sides of length 550 m, 300 m and 400 m.

(i) Construct the triangle, **using a ruler and compasses only**.
Use a scale of 1 cm to represent 50 m.
The side of length 550 m has been drawn for you.

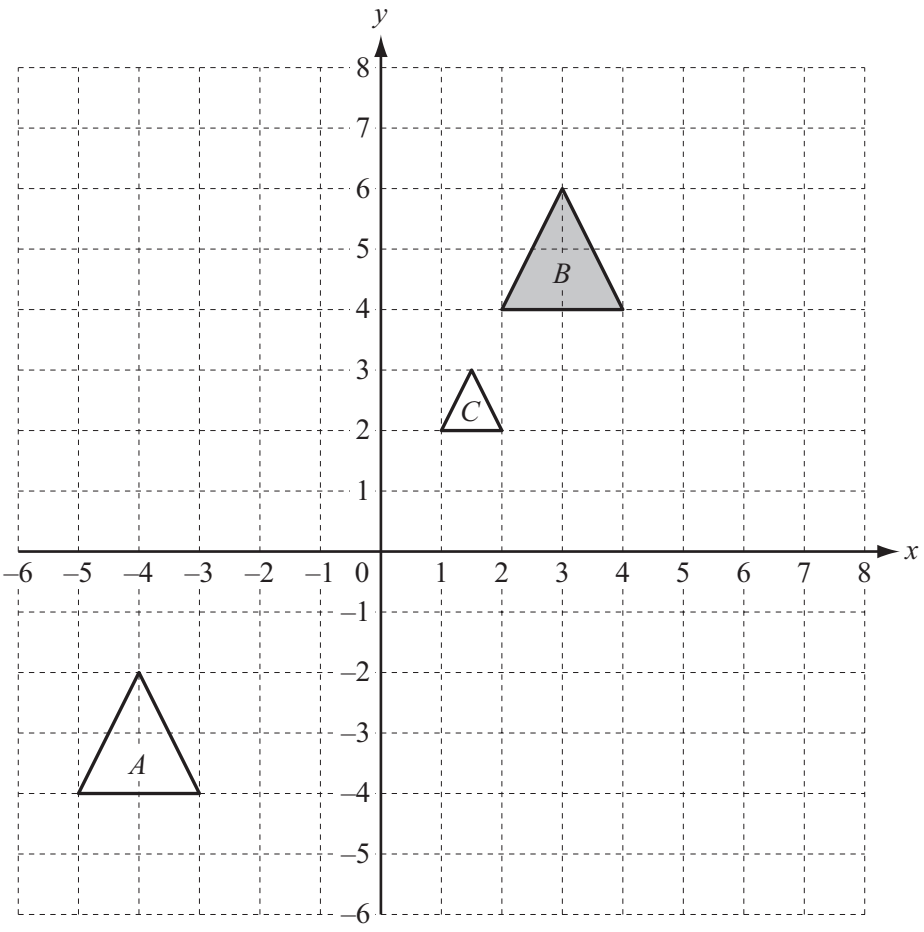
550 m

[3]

(ii) By making a suitable measurement on your diagram, calculate the area of the field.
Give your answer in square metres.

Answer(b)(ii) ..... m^2 [3]

4



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

Answer(a)(i) .....

..... [2]

(ii) Describe fully the **single** transformation which maps shape *B* onto shape *C*.

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

..... [3]

(b) (i) Reflect shape *B* in the *y*-axis. Label the image *D*. [1]

(ii) Rotate shape *B* through 90° anticlockwise about the origin. Label the image *E*. [2]

For Examiner's Use

5 **(a)** The cost, $\$C$, of a party for n people is calculated using the following formula.

$$C = 130 + 4n$$

(i) Calculate C when $n = 25$.

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

(ii) Eurdley has a party which costs \$1138.
How many people is this party for?

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

(b) Solve the following equations.

(i) $3x = 27$

Answer(b)(i) $x =$ ..... [1]

(ii) $8y - 4 = 24$

Answer(b)(ii) $y =$ ..... [2]

(iii) $4(5q - 2) = 72$

Answer(b)(iii) $q =$ ..... [3]

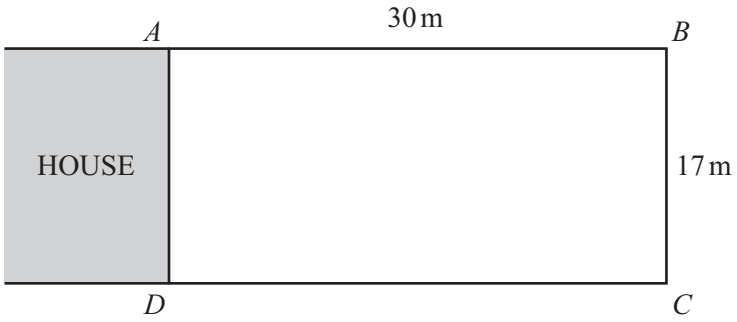
(c) Solve the simultaneous equations.

$$6x + 8y = -31$$
$$14x - 5y = 46$$

Answer(c) $x =$ .....

$y =$ ..... [4]

6



NOT TO SCALE

The rectangle *ABCD* shows Mr Liu's garden.

(a) Mr Liu puts a fence around three sides of his garden, *AB*, *BC* and *CD*.
The fence costs \$3.28 per metre.

Calculate the cost of the fence.

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

(b) (i) Calculate the area of Mr Liu's garden.

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

(ii) Mr Liu uses an area of 408 m^2 in his garden for a lawn, flowers and vegetables.
He divides this area into three parts, in the ratio

lawn : flowers : vegetables = 5 : 3 : 4 .

Calculate the area used for each part.

Answer(b)(ii) Lawn ..... m^2

Flowers ..... m^2

Vegetables ..... m^2 [3]

For Examiner's Use

(c) Mr Liu walks in a straight line across his garden from *A* to *C*.

Calculate the distance Mr Liu walks.

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

(d) Mr Liu has a circular pond, radius 4.5 m, in his garden.

(i) Calculate the area of the pond.

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

(ii) The pond is filled with water to a depth of 2 metres.

Calculate the volume of water in the pond.

Answer(d)(ii) ..... m^3 [1]

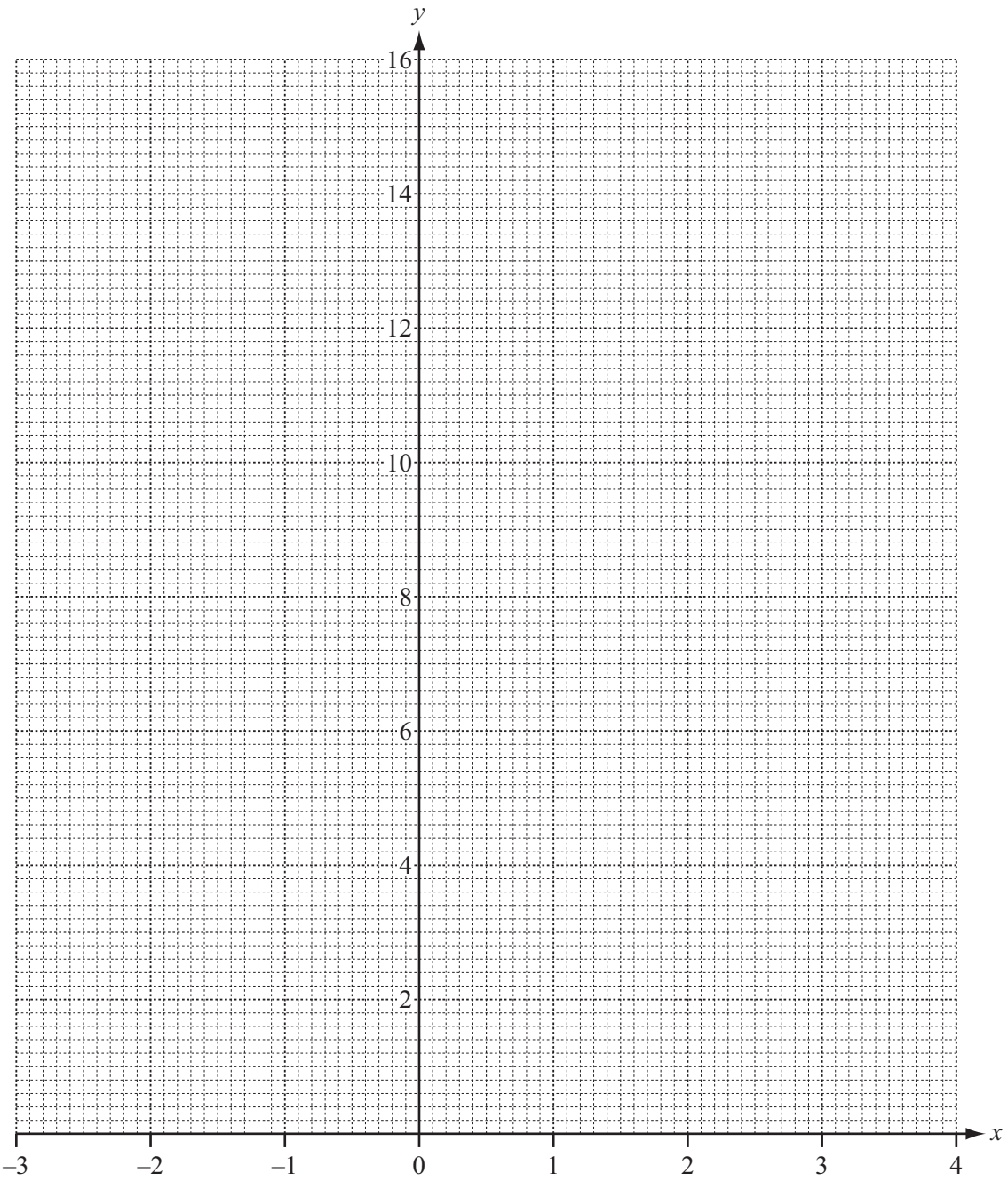
[Turn over

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

x	–3	–2	–1	0	1	2	3	4
y		8		2		4		

[3]

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



[4]

(c) Write down the equation of the line of symmetry of the graph.

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

(d) (i) On the grid, draw the line $y = 9$. [1]

(ii) Solve the equation $x^2 - x + 2 = 9$.

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

8

Month	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Average temperature in °C	–4.4	–4.2	–2.7	0.3	4.8	9.1	11.8	10.8	6.7	2.7	–1.1	–3.3

The table shows the average temperature for Tromso, Norway each month.

(a) (i) Write down the month which had the highest average temperature.

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

(ii) How much warmer was it in September than in February?

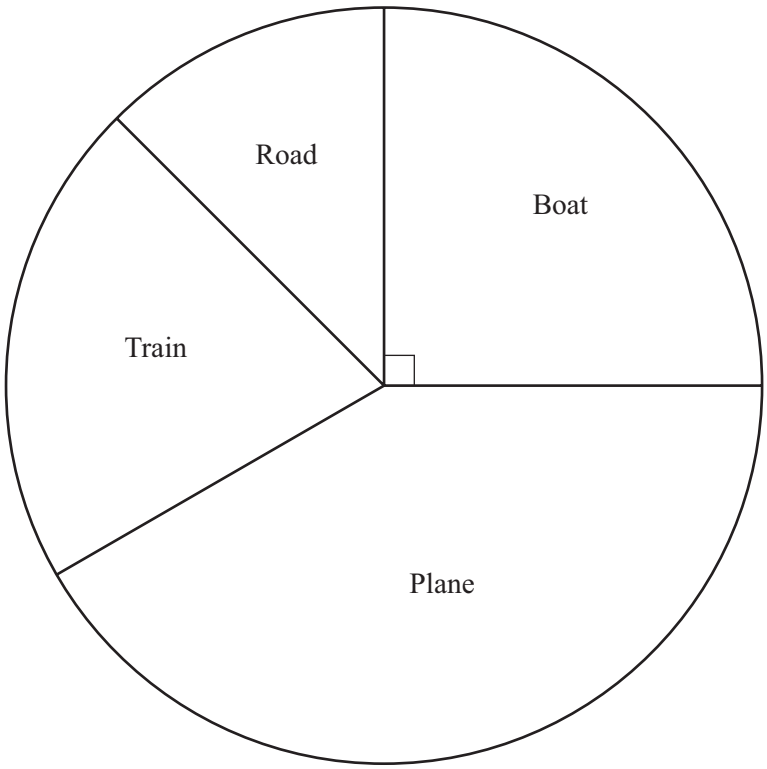
Answer(a)(ii) ..... °C [1]

(iii) The lowest temperature in October was 12.3°C below the average temperature for that month.

Work out the lowest temperature in October.

Answer(a)(iii) ..... °C [1]

(b) In a survey, some tourists were asked how they had travelled to Norway.
The pie chart shows the results.



(i) 150 of these tourists travelled by boat.

Show that 600 tourists took part in the survey.

Answer(b)(i)

[1]

(ii) Calculate the number of these tourists who travelled by plane.

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

(c) A train ticket from Oslo to Stavanger costs 885 krone.
There is a discount of 12% on the total cost of the tickets for a group of 10 or more people.

Calculate the cost of tickets for a group of 15 people.

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

(d) On 1 January 2000, the population of Norway was 4 480 000, correct to 3 significant figures.

(i) Write this number in standard form.

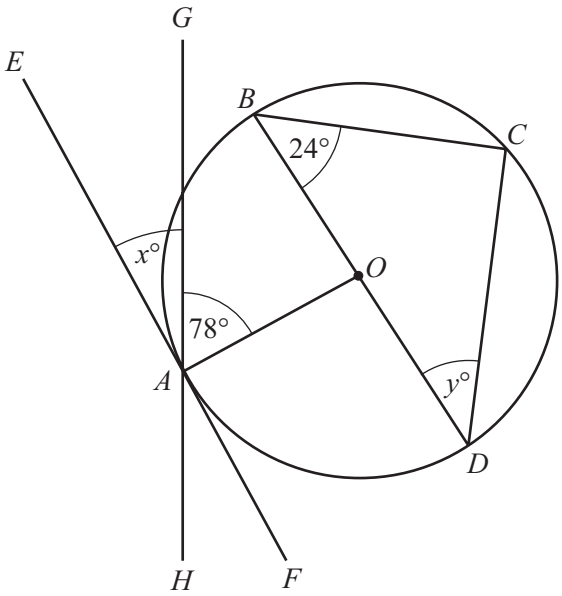
Answer(d)(i) ..... [1]

(ii) On 1 January 2011, the population of Norway was 4 920 000, correct to 3 significant figures.

Calculate the percentage increase in the population.

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

9



NOT TO SCALE

A, *B*, *C* and *D* are points on the circumference of a circle, centre *O*.
EF is a tangent to the circle at *A*.
GH is a straight line through the point *A*.
Angle *CBD* = 24° and angle *OAG* = 78°.

(a) (i) Write down the mathematical names of lines *BC* and *OA*.

Answer(a)(i) *BC* is a .....

OA is a ..... [2]

(ii) Find the value of *x*, giving a reason for your answer.

Answer(a)(ii) *x* = ... because .....

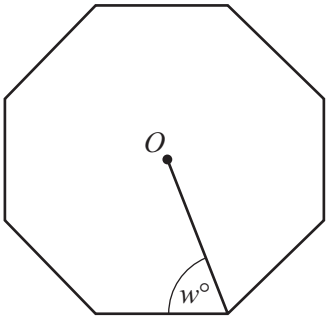
..... [2]

(iii) Find the value of *y*, giving a reason for your answer.

Answer(a)(iii) *y* = ... because .....

..... [3]

(b) The diagram shows a regular polygon, centre O.



NOT TO SCALE

(i) Write down the name of this polygon.

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

(ii) Find the value of w.
Show all your working.

Answer(b)(ii) w = ... [3]

(c) The exterior angle of another regular polygon is 24°.

Calculate the number of sides this polygon has.

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

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