UNIVERSITY OF CAMBRIDGE INTERNATIONAL EXAMINATIONS
International General Certificate of Secondary Education

CANDIDATE NAME

CENTRE NUMBER | | | | | |

CANDIDATE NUMBER | | | | |

MATHEMATICS **0580/22**

Paper 2 (Extended) **October/November 2013**

1 hour 30 minutes

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 70.

This document consists of **12** printed pages.

1 Write the following in order of size, smallest first.

19% $\quad \frac{1}{5} \quad \sqrt{0.038} \quad \sin 11.4° \quad 0.719^5$

Answer ..... < ..... < ..... < ..... < ..... [2]

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2 Use a calculator to work out the following.

(a) $3\,(-4 \times 6^2 - 5)$

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

(b) $\sqrt{3} \times \tan 30° + \sqrt{2} \times \sin 45°$

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

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3 Find the circumference of a circle of radius 2.5 cm.

Answer ..... cm [2]

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4 Bruce plays a game of golf.
His scores for each of the 18 holes are shown below.

2	3	4	5	4	6	2	3	4
4	5	3	4	3	5	4	4	4

The information is to be shown in a pie chart.

Calculate the sector angle for the score of 4.

Answer ..... [2]

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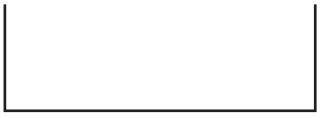
5 **(a)** Add **one** line to the diagram so that it has two lines of symmetry.

[1]

(b) Add **two** lines to the diagram so that it has rotational symmetry of order 2.



[1]

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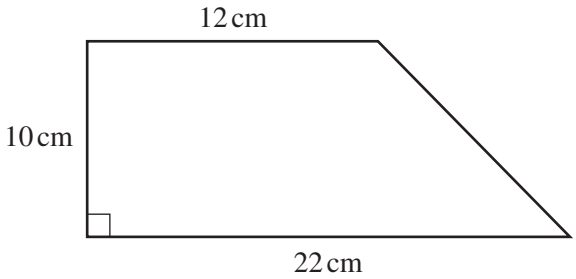
6 Rearrange the formula to make x the subject.

$$y = x^2 + 4$$

Answer $x =$ ..... [2]

7



NOT TO SCALE

Find the area of the trapezium.

Answer ..... cm^2 [2]

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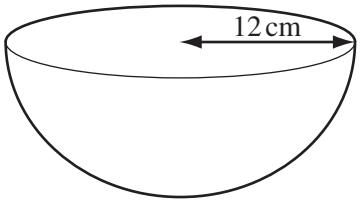
8 A **hemisphere** has a radius of 12 cm.

Calculate its volume.

[The volume, V, of a sphere with radius r is $V = \frac{4}{3}\pi r^3$.]



Answer ..... cm^3 [2]

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9 The exterior angle of a regular polygon is 36°.

What is the name of this polygon?

Answer ..... [3]

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10 The table shows how the dollar to euro conversion rate changed during one day.

Time	10 00	11 00	12 00	13 00	14 00	15 00	16 00
$1	€1.3311	€1.3362	€1.3207	€1.3199	€1.3200	€1.3352	€1.3401

Khalil changed $500 into euros (€).

How many more euros did Khalil receive if he changed his money at the highest rate compared to the lowest rate?

Answer € ..... [3]

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11 The speed, v, of a wave is inversely proportional to the square root of the depth, d, of the water.
$v = 30$ when $d = 400$.

Find v when $d = 25$.

Answer $v =$ ..... [3]

---

12 A circle has a radius of 8.5 cm correct to the nearest 0.1 cm.
The lower bound for the area of the circle is $p\pi$ cm^2.
The upper bound for the area of the circle is $q\pi$ cm^2.

Find the value of p and the value of q.

Answer $p =$ .....

$q =$ ..... [3]

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13 Pam wins the student of the year award in New Zealand.
She sends three photographs of the award ceremony by post to her relatives.

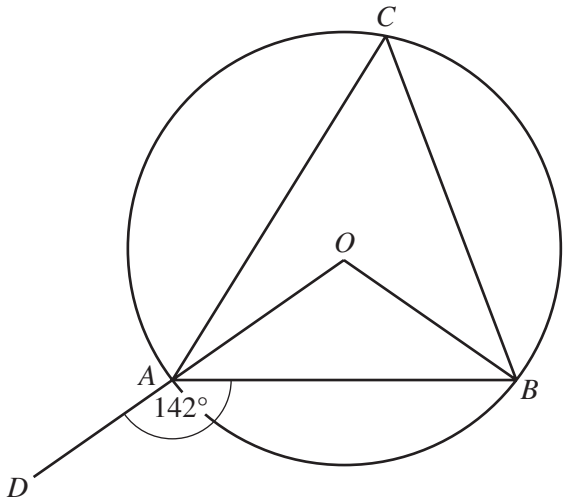
- one of size 13 cm by 23 cm to her uncle in Australia
- one of size 15 cm by 23 cm to her sister in China
- one of size 23 cm by 35 cm to her mother in the UK

Maximum lengths	Australia	Rest of the world
13 cm by 23.5 cm	\$1.90	\$2.50
15.5 cm by 23.5 cm	\$2.40	\$2.90
23 cm by 32.5 cm	\$2.80	\$3.40
26 cm by 38.5 cm	\$3.60	\$5.20

The cost of postage is shown in the table above.
Use this information to calculate the total cost.

Answer \$ ..... [3]

14



NOT TO SCALE

A, *B* and *C* are points on the circumference of a circle centre *O*.
OAD is a straight line and angle *DAB* = 142°.

Calculate the size of angle *ACB*.

Answer Angle *ACB* = ... [3]

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15 Find the co-ordinates of the point of intersection of the two lines.

$$2x - 7y = 2$$
$$4x + 5y = 42$$

Answer (..... , ...) [3]

---

16 Solve the inequality.

$$\frac{x}{2} + \frac{x-2}{3} < 5$$

Answer ..... [4]

17

$$\mathbf{M} = \begin{pmatrix} 2 & 1 \\ 4 & 6 \end{pmatrix} \qquad \mathbf{N} = \begin{pmatrix} 5 & 0 \\ 1 & 5 \end{pmatrix}$$

(a) Work out **MN**.

Answer(a) **MN** = [2]

(b) Find $\mathbf{M}^{-1}$.

Answer(b) $\mathbf{M}^{-1}$ = [2]

18 $A(5, 23)$ and $B(-2, 2)$ are two points.

(a) Find the co-ordinates of the midpoint of the line AB.

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

(b) Find the equation of the line AB.

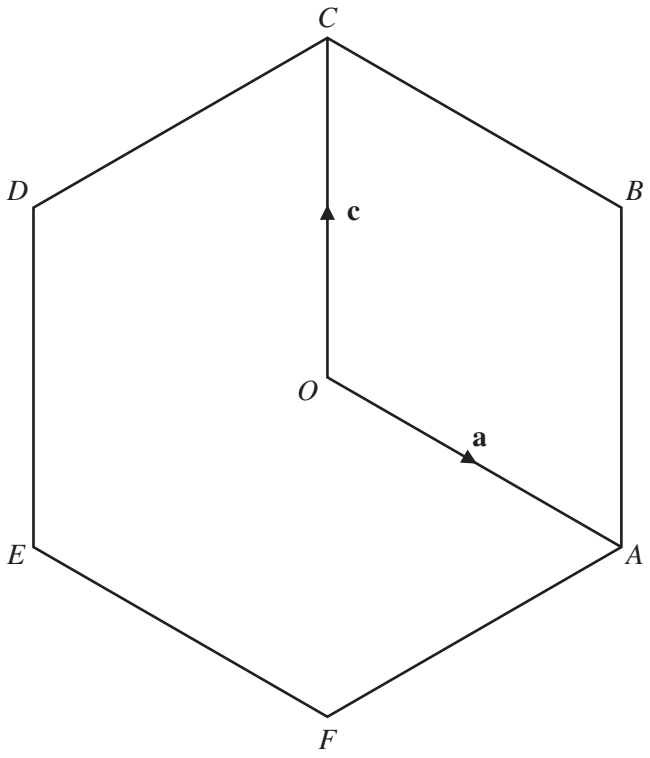
Answer(b) ..... [3]

(c) Show that the point (3, 17) lies on the line AB.

Answer(c)

[1]

19



O is the origin.
$ABCDEF$ is a regular hexagon and O is the midpoint of AD.

$\overrightarrow{OA} = \mathbf{a}$ and $\overrightarrow{OC} = \mathbf{c}$.

Find, in terms of **a** and **c**, in their simplest form

(a) $\overrightarrow{BE}$,

Answer(a) $\overrightarrow{BE}$ = ... [2]

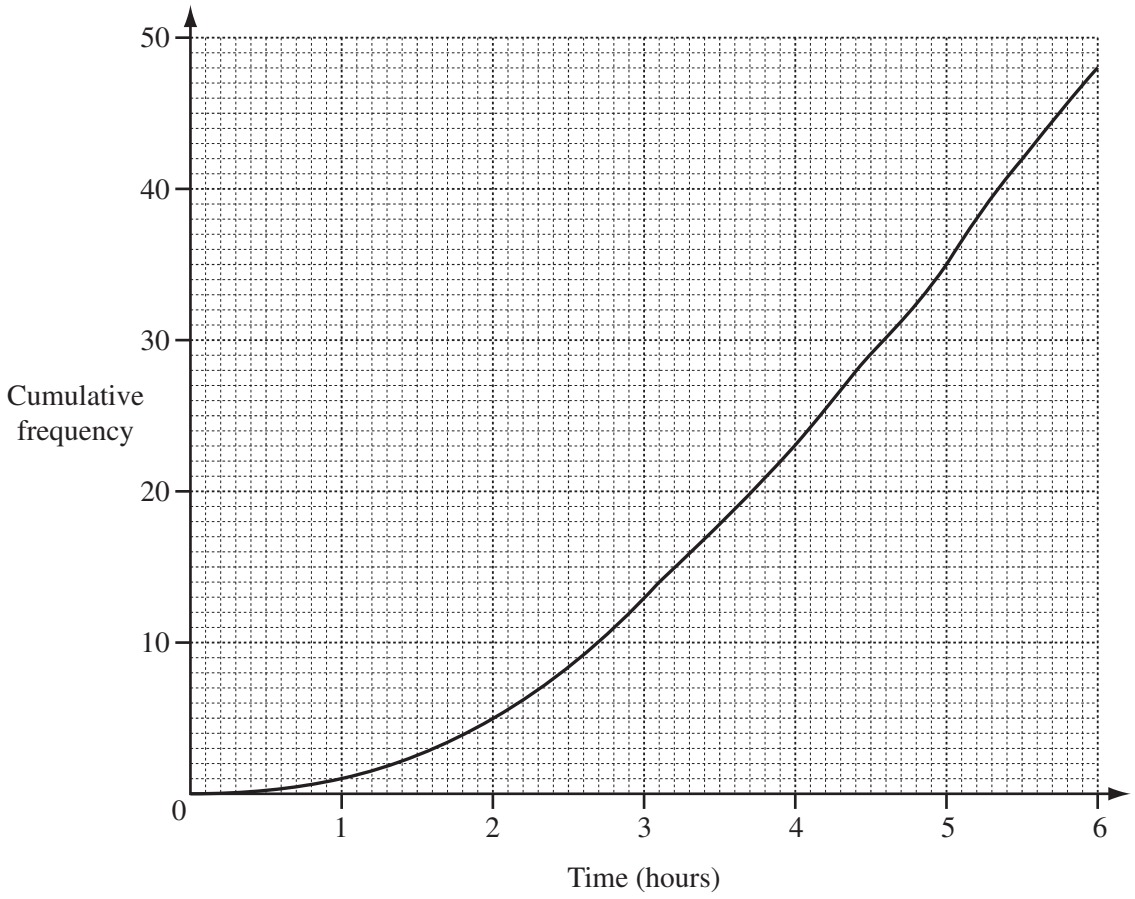
(b) $\overrightarrow{DB}$,

Answer(b) $\overrightarrow{DB}$ = ... [2]

(c) the position vector of E.

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

20 During one day 48 people visited a museum.
The length of time each person spent in the museum was recorded.
The results are shown on the cumulative frequency diagram.



Work out

(a) the median,

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

(b) the 20th percentile,

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

(c) the inter-quartile range,

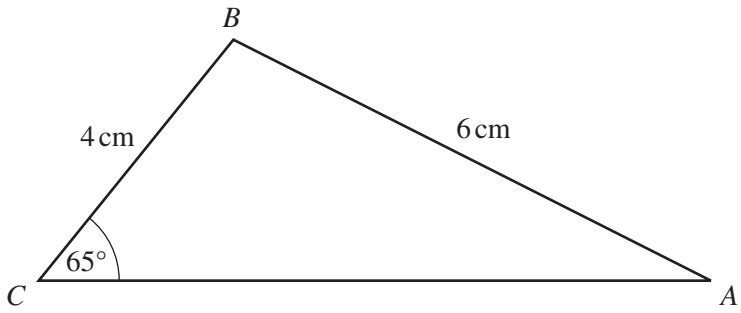
Answer(c) ..... h [2]

(d) the probability that a person chosen at random spends 2 hours or less in the museum.

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

Question 21 is printed on the next page.

21



NOT TO SCALE

In triangle ABC, $AB = 6$ cm, $BC = 4$ cm and angle $BCA = 65°$.

Calculate

(a) angle CAB,

Answer(a) Angle CAB = ... [3]

(b) the area of triangle ABC.

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