Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

3969340058

MATHEMATICS **0580/23**

Paper 2 (Extended) **May/June 2017**

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 an HB pencil for any diagrams or graphs.
Do not use staples, paper clips, 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 **11** printed pages and **1** blank page.

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CAMBRIDGE International Examinations

1 Calculate $\sqrt{\frac{1}{2}(1-\cos 48°)}$.

.....[1]

2 Factorise completely.

$$4x^2 - 8xy$$

.....[2]

3 Find the lowest common multiple (LCM) of 20 and 24.

.....[2]

4 Make a the subject of the formula.

$$x = y + \sqrt{a}$$

$a =$ .....[2]

5 Calculate the volume of a **hemisphere** with radius 3.2 cm.

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

.....cm^3 [2]

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6 The probability that Pedro scores a goal in any match is $\frac{2}{5}$.

Calculate the probability that Pedro scores a goal in each of the next two matches.

.....[2]

7 y is inversely proportional to x^2.
When $x = 2$, $y = 8$.

Find y in terms of x.

$y =$ .....[2]

8 Simplify.

$$\left(\frac{8}{a^{12}}\right)^{\frac{1}{3}}$$

.....[2]

9 **(a)** $\overrightarrow{GH} = \begin{pmatrix} 6 \\ -4 \end{pmatrix}$

Find

(i) $5\overrightarrow{GH}$,

$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(ii) $\overrightarrow{HG}$.

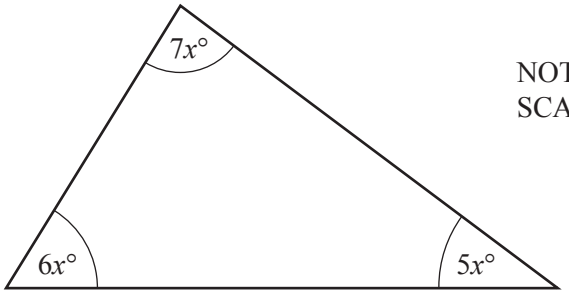
$\begin{pmatrix} \quad \\ \quad \end{pmatrix}$ [1]

(b) $\begin{pmatrix} 6 \\ 7 \end{pmatrix} + \begin{pmatrix} 2 \\ y \end{pmatrix} = \begin{pmatrix} 8 \\ 3 \end{pmatrix}$

Find the value of y.

$y =$ ..... [1]

10 The three angles in a triangle are $5x°$, $6x°$ and $7x°$.



NOT TO SCALE

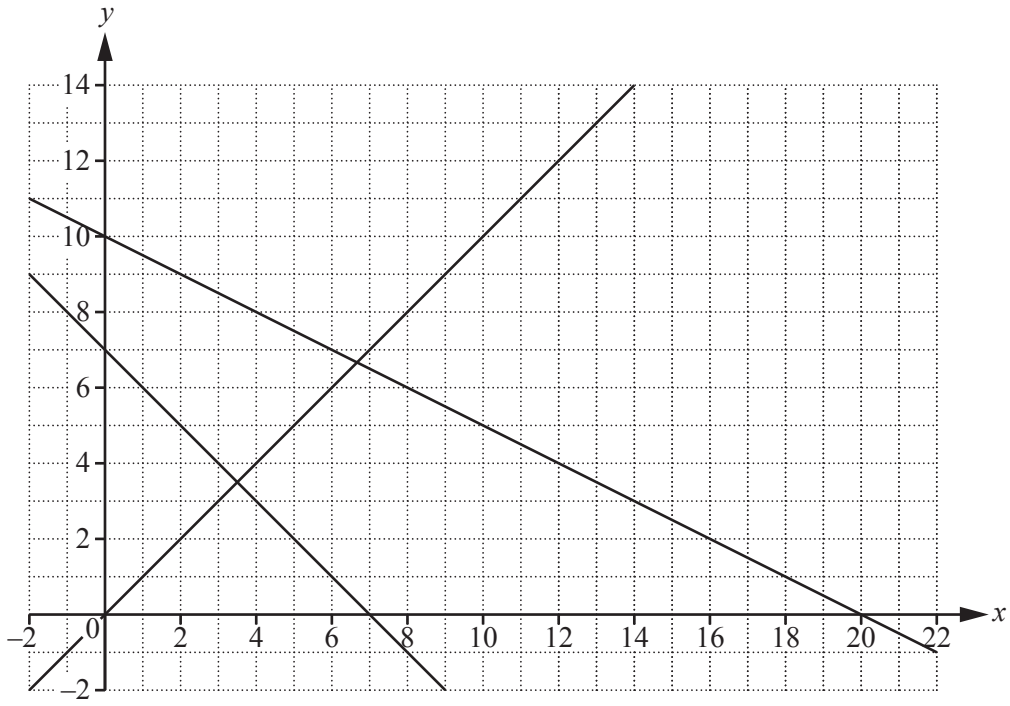
(a) Find the value of x.

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

(b) Work out the size of the largest angle in the triangle.

..... [1]

11



By shading the unwanted regions of the grid above, find and label the region R that satisfies the following four inequalities.

$$x \geqslant 0 \qquad x + y \geqslant 7 \qquad y \geqslant x \qquad x + 2y \leqslant 20$$

[3]

12 $\mathrm{f}(x) = 3 + 4x$ $\mathrm{g}(x) = 6x + 7$

Find, in its simplest form,

(a) $\mathrm{f}(3x)$,

.....[1]

(b) $\mathrm{fg}(x)$.

.....[2]

13 Two bottles and their labels are mathematically similar.
The smaller bottle contains 0.512 litres of water and has a label with area 96 cm^2.
The larger bottle contains 1 litre of water.

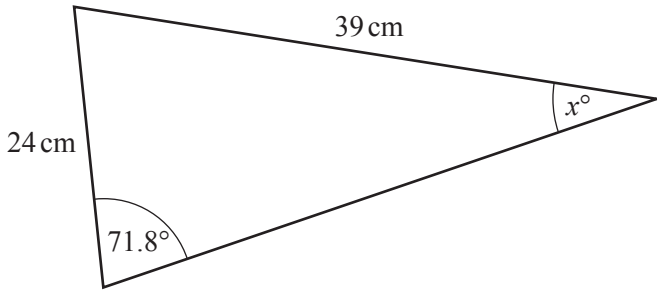
Calculate the area of the larger label.

.....cm^2 [3]

14 Write the recurring decimal $0.\dot{6}\dot{3}$ as a fraction in its lowest terms.
You must show all your working.

..... [3]

15



NOT TO SCALE

Find the value of x.

$x =$ ..... [3]

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16 **(a)** Solve the inequality.

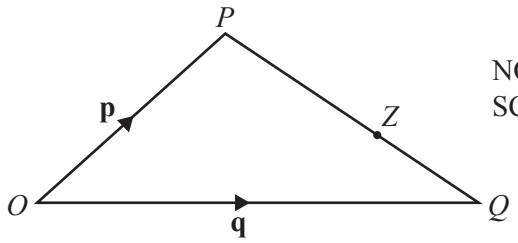
$$x + 13 \geqslant 3x + 7$$

.....[2]

(b) List the positive integers that satisfy the inequality in **part (a)**.

.....[1]

17



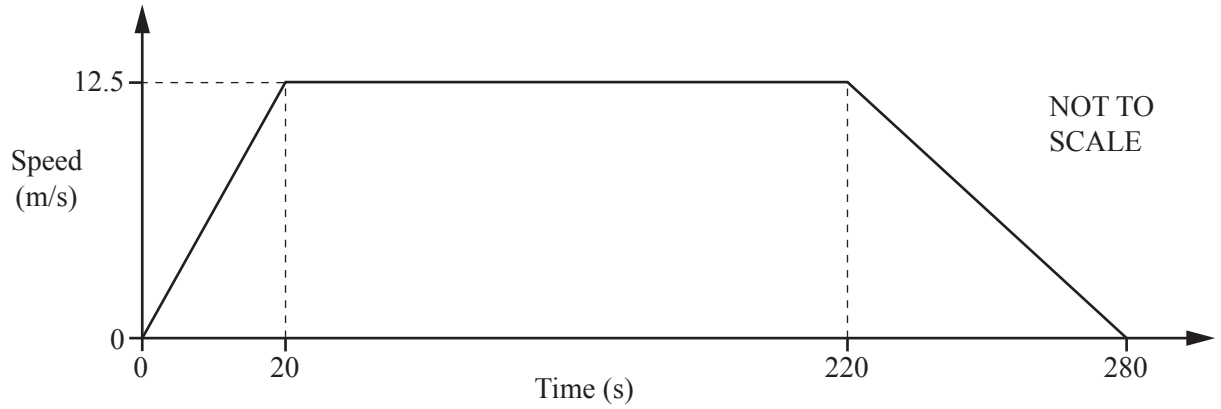
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O is the origin, $\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.
Z is a point on PQ such that $PZ : ZQ = 5 : 2$.

Work out, in terms of **p** and **q**, the position vector of Z.
Give your answer in its simplest form.

.....[3]

18 The diagram shows a speed-time graph for the journey of a car.



Calculate the total distance travelled.

.....m [3]

19 **Without using your calculator**, work out $\frac{11}{12} - \left(\frac{3}{4} - \frac{2}{3}\right)$.

You must show all your working and give your answer as a fraction in its simplest form.

..... [4]

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20 Simplify.

(a) $6w^0$

..... [1]

(b) $5x^3 - 3x^3$

..... [1]

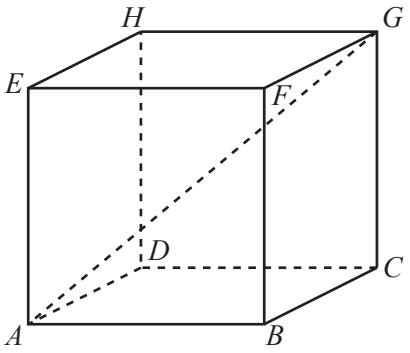
(c) $3y^6 \times 5y^{-2}$

..... [2]

21 Solve the equation $5x^2 + 10x + 2 = 0$.
You must show all your working and give your answers correct to 2 decimal places.

$x =$ ..... or $x =$ ..... [4]

22 The diagram shows a cube *ABCDEFGH* of side length 26 cm.



NOT TO SCALE

Calculate the angle between *AG* and the base of the cube.

.....[4]

23 **(a)** Simplify.

$$\frac{4(x-6)^2}{(x-6)}$$

.....[1]

(b) Expand the brackets and simplify.

$$(x+4)^2+5(3x+2)$$

.....[3]

24 Marcel invests \$2500 for 3 years at a rate of 1.6% per year simple interest.
Jacques invests \$2000 for 3 years at a rate of x% per year compound interest.
At the end of the 3 years Marcel and Jacques receive the same amount of interest.

Calculate the value of x correct to 3 significant figures.

$x =$ ..... [5]

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