Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

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.

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CAMBRIDGE International Examinations

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

View solution

.....[1]

2 Factorise completely.

$$4x^2 - 8xy$$

View solution

.....[2]

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

View solution

.....[2]

4 Make a the subject of the formula.

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

View solution

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

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

View solution

[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 $\frac{2}{5}$.

View solution

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 $x = 2$, $y = 8$.

View solution

Find y in terms of x.

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

8 Simplify.

View solution

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

..... [2]

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

View solution

Find

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

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

(ii) $\overrightarrow{HG}$.

View solution

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

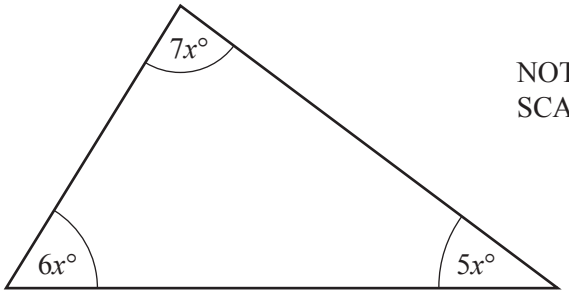
(b) $\begin{pmatrix} 6 \\ 7 \end{pmatrix} + \begin{pmatrix} 2 \\ y \end{pmatrix} = \begin{pmatrix} 8 \\ 3 \end{pmatrix}$

View solution

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.

View solution

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

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

View solution

..... [1]

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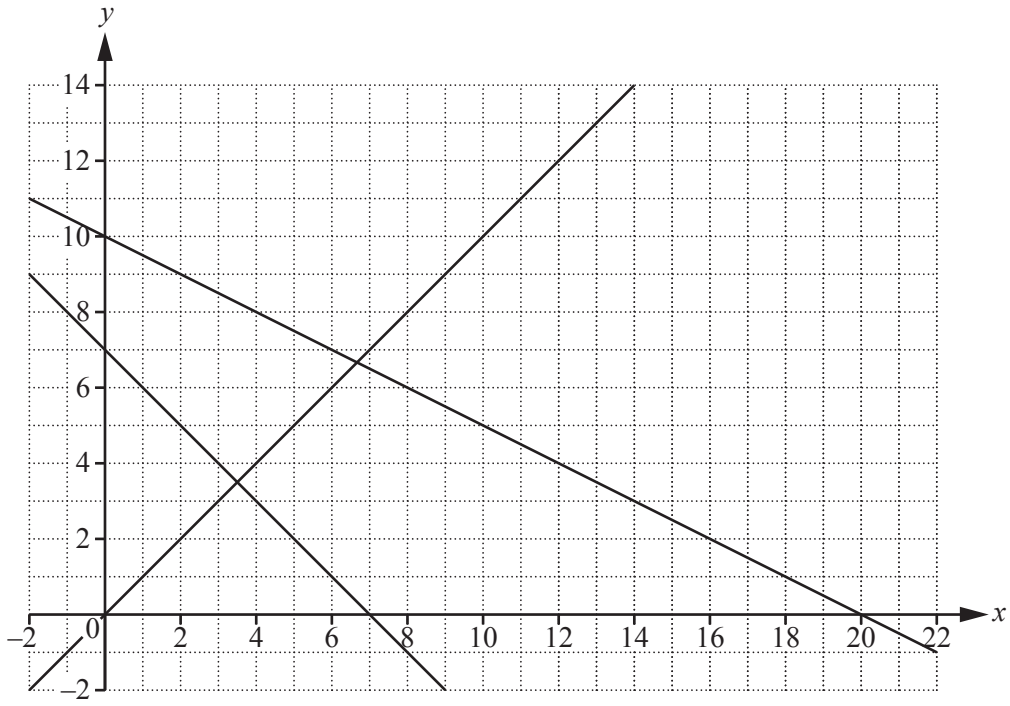
11

View solution



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 $f(x) = 3 + 4x$ $g(x) = 6x + 7$

Find, in its simplest form,

(a) $f(3x)$,

View solution

..... [1]

(b) $fg(x)$.

View solution

..... [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.

View solution

Calculate the area of the larger label.

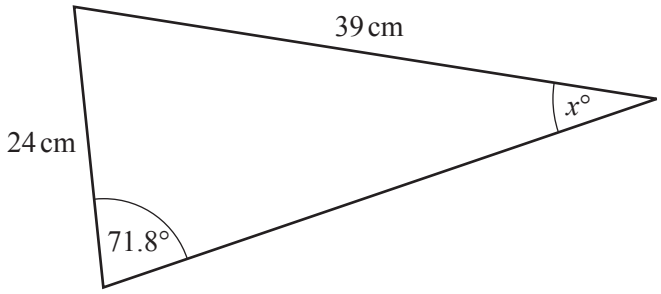
.....cm^2 [3]

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

View solution

.....[3]

15



NOT TO SCALE

View solution

Find the value of x.

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

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

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

View solution

.....[2]

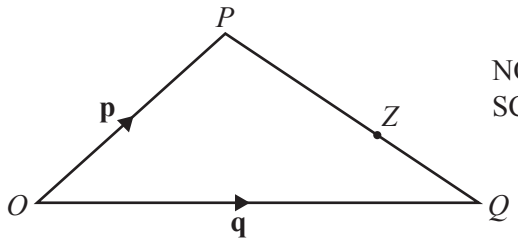
(b) List the positive integers that satisfy the inequality in **part (a)**.

View solution

.....[1]

17

View solution



NOT TO SCALE

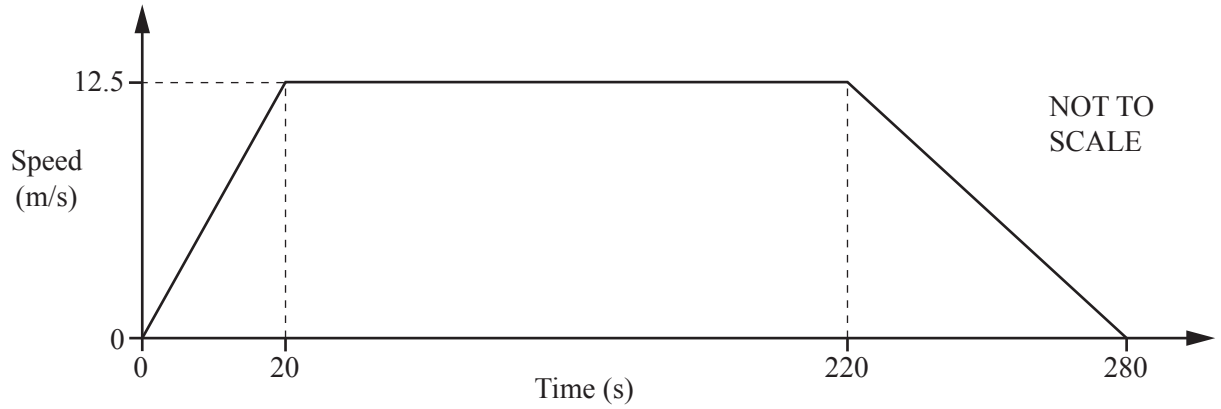
O is the origin, $\overrightarrow{OP} = \mathbf{p}$ and $\overrightarrow{OQ} = \mathbf{q}$.
Z is a point on PQ such that $PZ : ZQ = 5 : 2$.

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.

View solution



Calculate the total distance travelled.

.....m [3]

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

View solution

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

..... [4]

20 Simplify.

(a) $6w^0$

View solution

..... [1]

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

View solution

..... [1]

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

View solution

..... [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.

View solution

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

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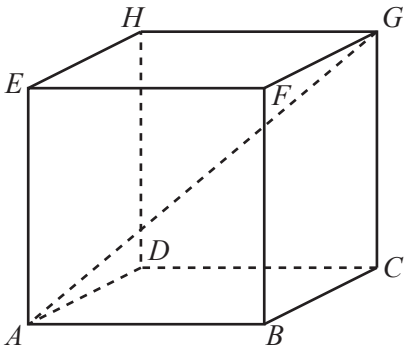
22 The diagram shows a cube *ABCDEFGH* of side length 26 cm.

View solution



NOT TO SCALE

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

.....[4]

23 **(a)** Simplify.

View solution

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

.....[1]

(b) Expand the brackets and simplify.

View solution

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

.....[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.

View solution

Calculate the value of x correct to 3 significant figures.

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

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