Cambridge IGCSE

Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

CANDIDATE NAME									
CENTRE NUMBER						CANDIDATE NUMBER				

MATHEMATICS **0580/22**

Paper 2 (Extended) **May/June 2016**

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.

The syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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CAMBRIDGE International Examinations

1 Write 0.000 057 4 in standard form.

View solution

..... [1]

2 Calculate.

$$\frac{3.07 + 2^4}{5.03 - 1.79}$$

View solution

..... [1]

3 Write 3.5897 correct to 4 significant figures.

View solution

..... [1]

4 A quadrilateral has rotational symmetry of order 2 and no lines of symmetry.

Write down the mathematical name of this quadrilateral.

View solution

..... [1]

5 8 9 10 11 12 13 14 15 16

From the list of numbers, write down

(a) the square numbers,

View solution

..... [1]

(b) a prime factor of 99.

View solution

..... [1]

6 Simplify.

$$\left(\frac{1}{2}x^{\frac{2}{3}}\right)^3$$

View solution

..... [2]

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7 A map is drawn to a scale of 1 : 1 000 000.
A forest on the map has an area of 4.6 cm^2.

View solution

Calculate the actual area of the forest in square kilometres.

..... km^2 [2]

8 Solve the inequality $\frac{x}{3} + 5 > 2$.

View solution

..... [2]

9 A regular polygon has an interior angle of 172°.

View solution

Find the number of sides of this polygon.

..... [3]

10 Make p the subject of the formula.

View solution

$$rp + 5 = 3p + 8r$$

p = ... [3]

11 Shahruk plays four games of golf.
His four scores have a mean of 75, a mode of 78 and a median of 77.

View solution

Work out his four scores.

.... [3]

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12 Write the recurring decimal $0.3\dot{6}$ as a fraction.
Give your answer in its simplest form.
[$0.3\dot{6}$ means 0.3666…]

View solution

..... [3]

13 The base of a triangle is 9 cm correct to the nearest cm.
The area of this triangle is 40 cm^2 correct to the nearest 5 cm^2.

Calculate the upper bound for the perpendicular height of this triangle.

View solution

..... cm [3]

14 **Without using a calculator**, work out $2\frac{5}{8} \times \frac{3}{7}$.
Show all your working and give your answer as a mixed number in its lowest terms.

View solution

..... [3]

15 $y = x^2 + 7x - 5$ can be written in the form $y = (x + a)^2 + b$.

Find the value of a and the value of b.

View solution

a = ...

b = ... [3]

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16 Solve the simultaneous equations.
Show all your working.

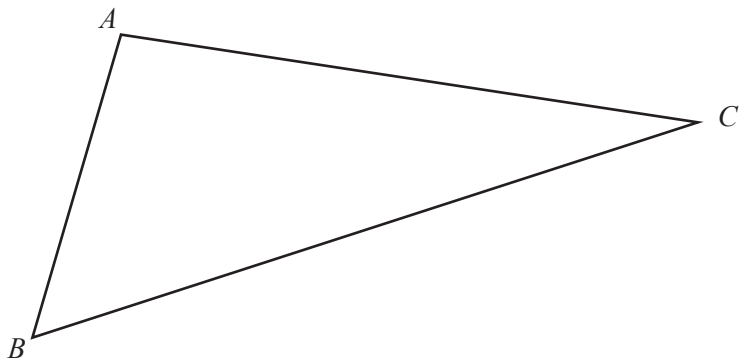
View solution

$$3x + 4y = 14$$
$$5x + 2y = 21$$

$x =$ .....

$y =$ ..... [3]

17 The diagram shows triangle ABC.



View solution

(a) **Using a straight edge and compasses only**, construct the bisector of angle ABC. [2]

(b) Draw the locus of points **inside** the triangle that are 3 cm from AC. [1]

View solution

18 Find the nth term of each of these sequences.

(a) 16, 19, 22, 25, 28, …

View solution

..... [2]

(b) 1, 3, 9, 27, 81, …

View solution

..... [2]

19 It is estimated that the world's population is growing at a rate of 1.14% per year.
On January 1st 2014 the population was 7.23 billion.

(a) Find the expected population on January 1st 2020.

View solution

.....billion [2]

(b) Find the year when the population is expected to reach 10 billion.

View solution

..... [2]

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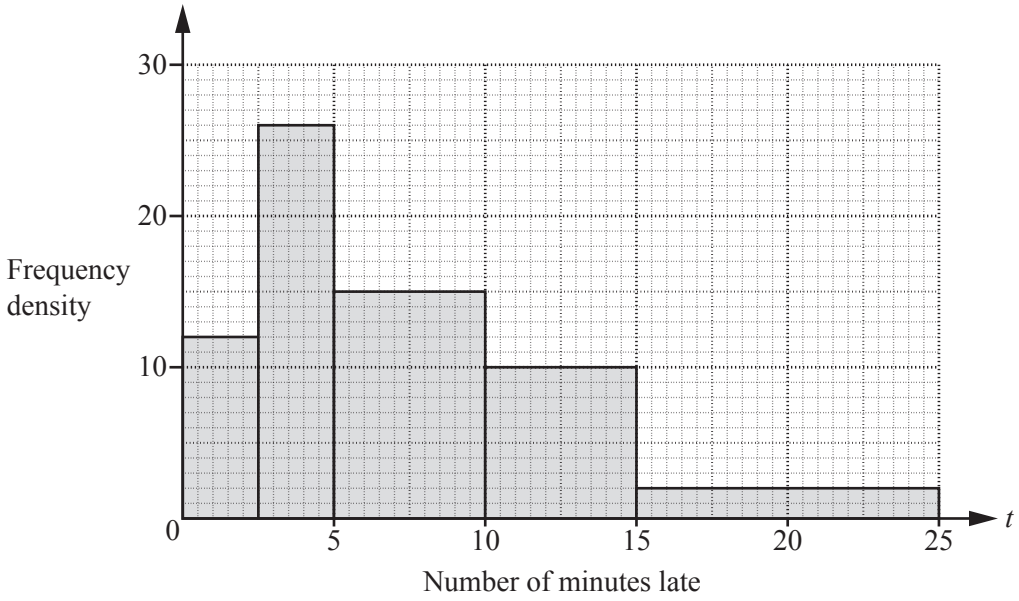
20 Deborah records the number of minutes late, t, for trains arriving at a station.
The histogram shows this information.



(a) Find the number of trains that Deborah recorded.

View solution

..... [2]

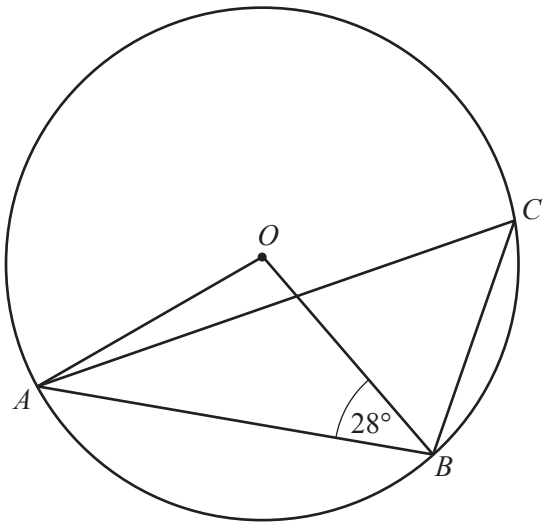
(b) Calculate the percentage of the trains recorded that arrived more than 10 minutes late.

View solution

.....% [2]

21

View solution



NOT TO SCALE

In the diagram, A, B and C lie on the circumference of a circle, centre O.

Work out the size of angle ACB.
Give a reason for each step of your working.

Angle ACB = ... [4]

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22 $\mathbf{M} = \begin{pmatrix} 5 & 1 \\ -3 & -2 \end{pmatrix}$

(a) Work out $4\mathbf{M}$.

View solution

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

(b) Work out $\mathbf{M}^2$.

View solution

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

(c) Find $\mathbf{M}^{-1}$, the inverse of $\mathbf{M}$.

View solution

$\begin{pmatrix} \quad & \quad \\ \quad & \quad \end{pmatrix}$ [2]

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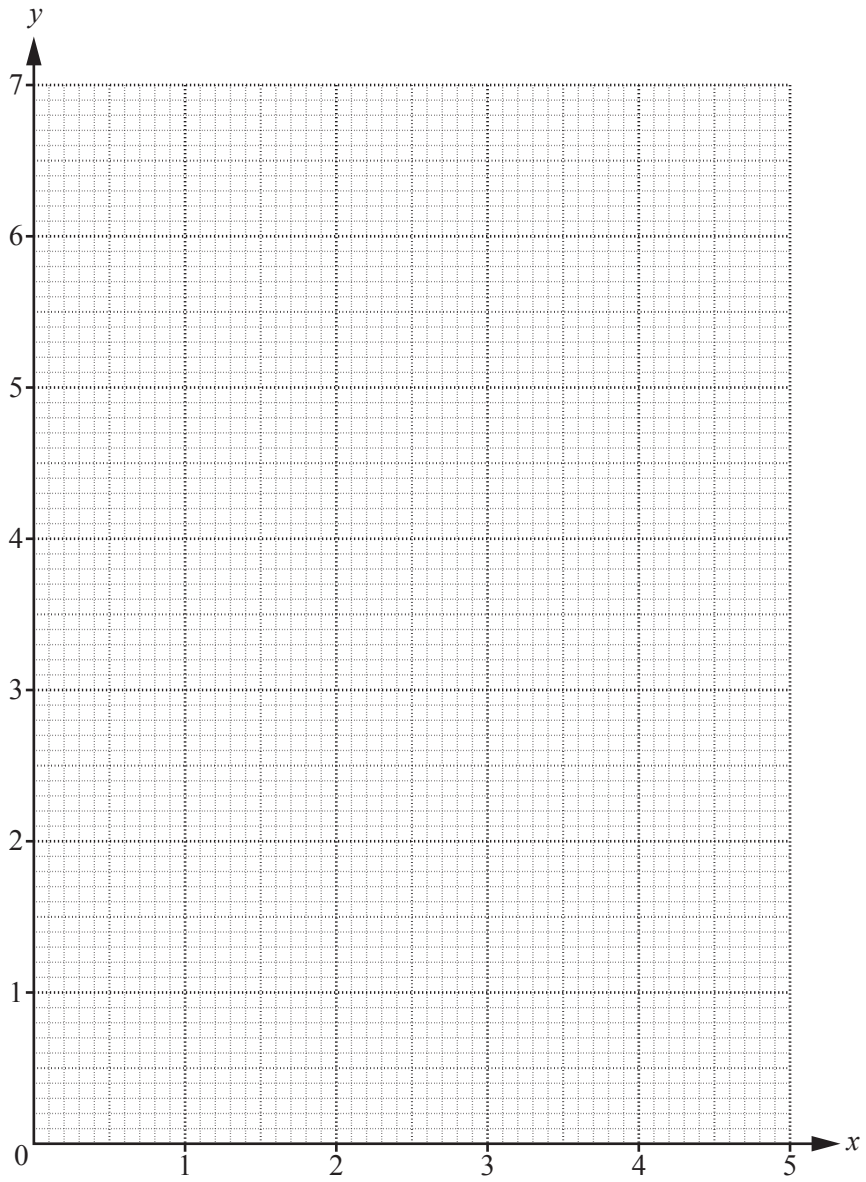
23

View solution



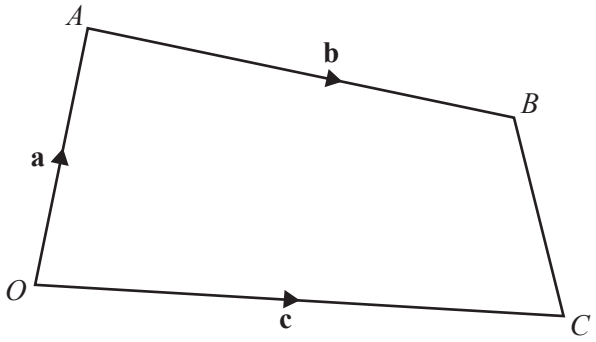
The region R satisfies these inequalities.

$y \leqslant 2x$ $\quad$ $3x + 4y \geqslant 12$ $\quad$ $x \leqslant 3$

On the grid, draw and label the region R that satisfies these inequalities.
Shade the **unwanted** regions.

[5]

24



NOT TO SCALE

In the diagram, O is the origin, $\overrightarrow{OA} = \mathbf{a}$, $\overrightarrow{OC} = \mathbf{c}$ and $\overrightarrow{AB} = \mathbf{b}$.
P is on the line AB so that $AP : PB = 2 : 1$.
Q is the midpoint of BC.

Find, in terms of **a**, **b** and **c**, in its simplest form

(a) $\overrightarrow{CB}$,

View solution

$\overrightarrow{CB}$ = ... [1]

(b) the position vector of Q,

View solution

..... [2]

(c) $\overrightarrow{PQ}$.

View solution

$\overrightarrow{PQ}$ = ... [2]

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