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# Cambridge IGCSE™

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*0069181711*

**MATHEMATICS** **0580/23**

Paper 2 (Extended) **October/November 2020**

**1 hour 30 minutes**

You must answer on the question paper.

You will need: Geometrical instruments

**INSTRUCTIONS**

- Answer **all** questions.
- Use a black or dark blue pen. You may use an HB pencil for any diagrams or graphs.
- Write your name, centre number and candidate number in the boxes at the top of the page.
- Write your answer to each question in the space provided.
- Do **not** use an erasable pen or correction fluid.
- Do **not** write on any bar codes.
- You should use a calculator where appropriate.
- You may use tracing paper.
- You must show all necessary working clearly.
- Give non-exact numerical answers correct to 3 significant figures, or 1 decimal place for angles in degrees, unless a different level of accuracy is specified in the question.
- For $\pi$, use either your calculator value or 3.142.

**INFORMATION**

- The total mark for this paper is 70.
- The number of marks for each question or part question is shown in brackets [ ].

This document has **12** pages. Blank pages are indicated.


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**1** Write down the cube number that is greater than 50 but less than 100.

..... [1]

**2** Calculate.

$$\frac{4}{\sqrt{0.0025}}$$

..... [1]

**3** In triangle $ABC$, $BC = 7.6\,\text{cm}$ and $AC = 6.2\,\text{cm}$.

**Using a ruler and compasses only**, construct triangle $ABC$.
Leave in your construction arcs.
The side $AB$ has been drawn for you.




[2]

**4** Simplify.

$a^2 \div a^6$

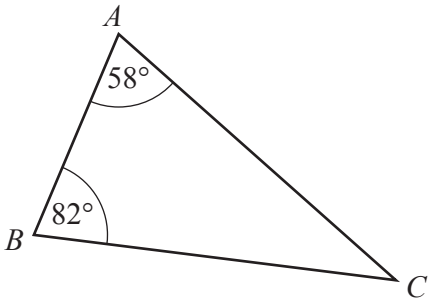
..... [1]

**5** Thor changes 40 000 Icelandic Krona into dollars when the exchange rate is 1 krona = \$0.0099 .

Work out how many dollars he receives.

\$ ..... [1]

**6**




NOT TO SCALE

The diagram shows triangle *ABC*.
The triangle is reflected in the line *BC* to give a quadrilateral *ABDC*.

**(a)** Write down the mathematical name of the quadrilateral *ABDC*.

..... [1]

**(b)** Find angle *ACD*.

Angle *ACD* = ..... [2]

**7** Change 457 000 $cm^2$ into $m^2$.

.....$m^2$ [1]

**8** The length, $l$ cm, of a line is 18.3 cm, correct to the nearest millimetre.

Complete this statement about the value of $l$.

..... $\leqslant l <$ ..... [2]

**9** **Without using a calculator**, work out $1\frac{1}{7} \times 2\frac{1}{10}$.
You must show all your working and give your answer as a mixed number in its simplest form.

..... [3]

**10** Solve the simultaneous equations.
You must show all your working.

$$3x - 8y = 22$$
$$x + 4y = 4$$

$x =$ .....

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

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**11** A bag contains 7 red discs, 5 green discs and 2 pink discs.

**(a)** Helen takes one disc at random, records the colour and replaces it in the bag.
She does this 140 times.

Find how many times she expects to take a green disc.

..... [2]

**(b)** Helen adds 9 green discs and some pink discs to the discs already in the bag.
The probability of taking a green disc is now $\frac{2}{7}$.

Find the number of pink discs that Helen added to the bag.

..... [2]

**12** A straight line, $l$, has equation $y = 5x + 12$.

**(a)** Write down the gradient of line $l$.

..... [1]

**(b)** Find the coordinates of the point where line $l$ crosses the $x$-axis.

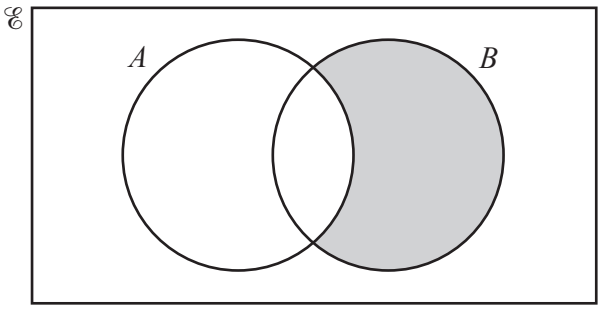
( ..... , .....) [2]

**(c)** A line perpendicular to line $l$ has gradient $k$.

Find the value of $k$.

$k =$ ..... [1]

**13**




Use set notation to describe the shaded region.

..... [1]

**14** $N = 2^4 \times 3 \times 7^5$

$PN = K$, where $P$ is an integer and $K$ is a square number.

Find the smallest value of $P$.

$P =$ ..... [2]

**15** $m = 2p + \sqrt{\frac{x}{y}}$

Make $x$ the subject of this formula.

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

**16** A paperweight has height 4 cm and volume 38.4 $cm^3$.
A mathematically similar paperweight has height 7 cm.

Calculate the volume of this paperweight.

..... $cm^3$ [3]

**17** Adil and Brian are paid the same wage.
Adil is given a 7% pay decrease and his new wage is $427.80 .
Brian is given a 7% pay increase.

Work out Brian's new wage.

$ ..... [3]

**18** **(a)** Simplify. $\left(4xy^2\right)^3$

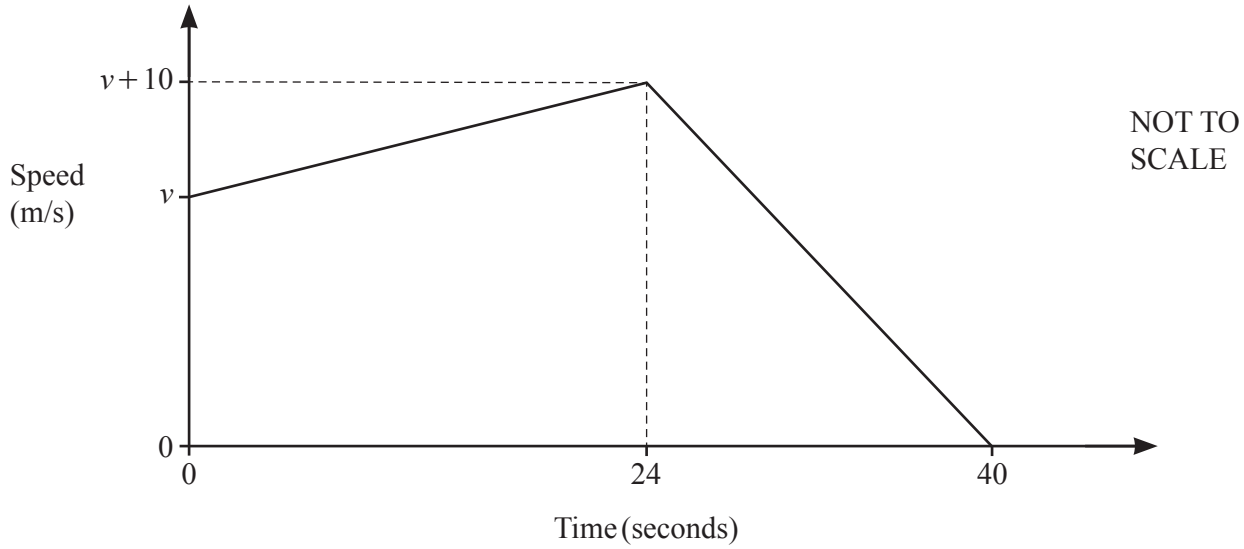
..... [2]

**(b)** $25 = 125^k$

Find the value of $k$.

$k =$ ..... [1]

**19**




The diagram shows the speed–time graph for the final 40 seconds of a car journey.
At the start of the 40 seconds the speed is $v$ m/s.

**(a)** Find the acceleration of the car during the first 24 seconds.

..... m/s$^2$ [1]

**(b)** The total distance travelled during the 40 seconds is 1.24 **kilometres**.

Find the value of $v$.

$v =$ ..... [4]

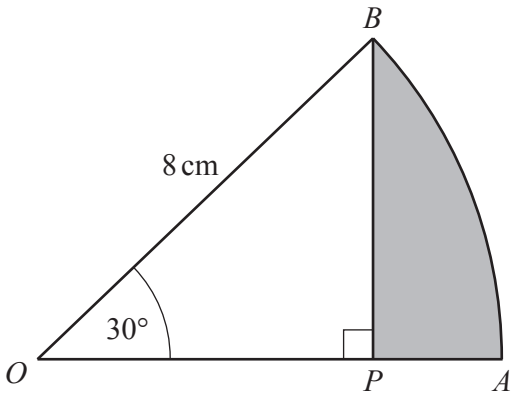
**20** Factorise.

$3x + 8y - 6ax - 16ay$

..... [2]

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**21**




NOT TO SCALE

*OAB* is the sector of a circle, centre *O*.
*OB* = 8 cm and angle *AOB* = 30°.
*BP* is perpendicular to *OA*.

**(a)** Calculate *AP*.

*AP* = ..... cm [3]

**(b)** Work out the area of the shaded region *APB*.

..... $cm^2$ [3]

**22** The table shows information about the times, $t$ seconds, taken by each of 100 students to solve a puzzle.

| Time ($t$ seconds) | $0 < t \leqslant 10$ | $10 < t \leqslant 15$ | $15 < t \leqslant 20$ | $20 < t \leqslant 40$ | $40 < t \leqslant 75$ |
|---|---|---|---|---|---|
| Frequency | 9 | 18 | 22 | 30 | 21 |

**(a)** Calculate an estimate of the mean time.

..... s [4]

**(b)** Emmanuel draws a histogram to show this information.
The table shows the heights, in cm, of some of the bars for this histogram.

Complete the table.

| Time ($t$ seconds) | $0 < t \leqslant 10$ | $10 < t \leqslant 15$ | $15 < t \leqslant 20$ | $20 < t \leqslant 40$ | $40 < t \leqslant 75$ |
|---|---|---|---|---|---|
| Height of bar (cm) | 3.6 | 14.4 | 17.6 | | |

[3]

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**23** $y$ is inversely proportional to the square root of $x$.
When $y = 7$, $x = 2.25$ .

Write $y$ in terms of $x$.

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

**24** Simplify.

$$\frac{x^2 - 25}{x^2 - 17x + 60}$$

..... [4]

**Question 25 is printed on the next page.**

**25** Solve $3\tan x = -4$ for $0° \leqslant x \leqslant 360°$.

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

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