



# Cambridge IGCSE™

CANDIDATE  
NAME

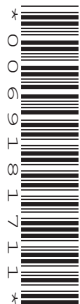
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CENTRE  
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**MATHEMATICS**

**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.

- 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  $ABC$ ,  $BC = 7.6$  cm and  $AC = 6.2$  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.

$$a^2 \div a^6$$

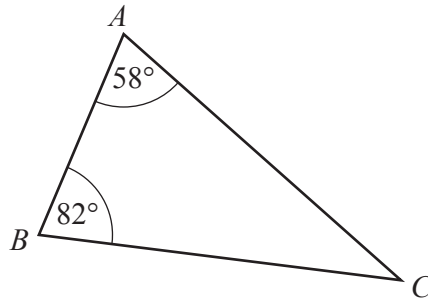
..... [1]

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<sup>2</sup> into m<sup>2</sup>.

.....m<sup>2</sup> [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  $l$ .

$$\dots\dots\dots \leq l < \dots\dots\dots [2]$$

- 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.

$$\dots\dots\dots [3]$$

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

$$\begin{aligned} 3x - 8y &= 22 \\ x + 4y &= 4 \end{aligned}$$

$$x = \dots\dots\dots$$

$$y = \dots\dots\dots [3]$$

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.

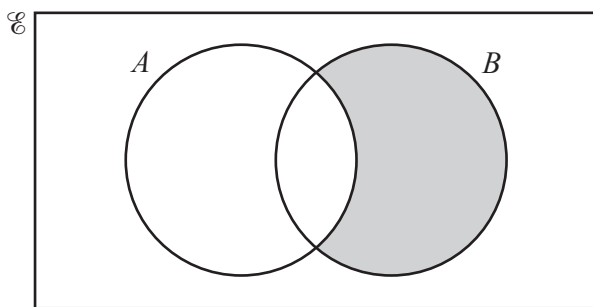
(..... , .....) [2]

- (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  $38.4 \text{ cm}^3$ .  
A mathematically similar paperweight has height 7 cm.

Calculate the volume of this paperweight.

.....  $\text{cm}^3$  [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.  $(4xy^2)^3$

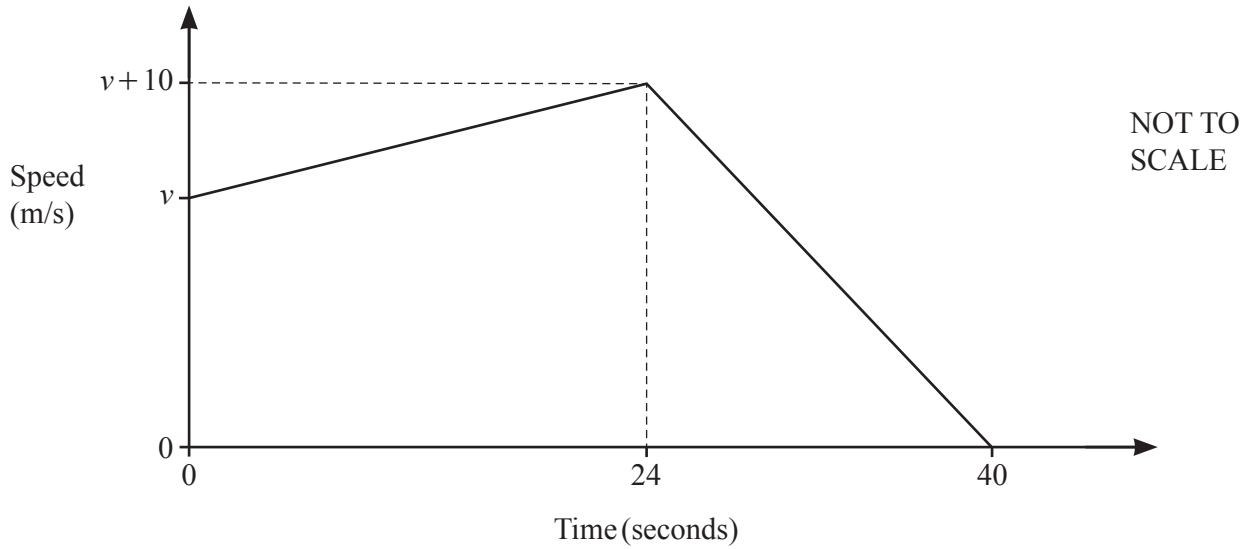
..... [2]

(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.

.....  $\text{m/s}^2$  [1]

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

Find the value of  $v$ .

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

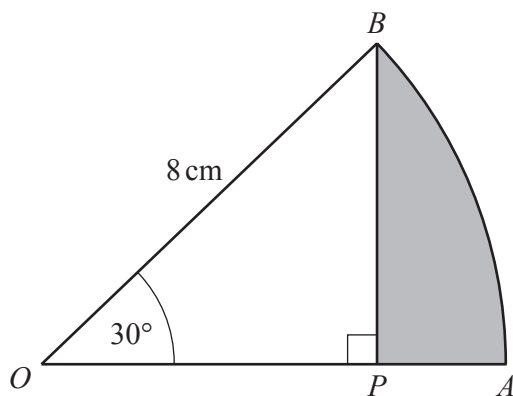
20 Factorise.

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

..... [2]



21



NOT TO SCALE

$OAB$  is the sector of a circle, centre  $O$ .  
 $OB = 8$  cm and angle  $AOB = 30^\circ$ .  
 $BP$  is perpendicular to  $OA$ .

(a) Calculate  $AP$ .

$AP = \dots\dots\dots$  cm [3]

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

$\dots\dots\dots$  cm<sup>2</sup> [3]

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

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

[3]

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

Write  $y$  in terms of  $x$ .

$$y = \dots\dots\dots [2]$$

- 24 Simplify.

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

$$\dots\dots\dots [4]$$

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

25 Solve  $3 \tan x = -4$  for  $0^\circ \leq x \leq 360^\circ$ .

$x = \dots\dots\dots$  or  $x = \dots\dots\dots$  [3]

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