

# **Cambridge IGCSE™**

CANDIDATE  
NAME

--	--	--	--	--

CENTRE  
NUMBER

--	--	--	--	--

CANDIDATE  
NUMBER

--	--	--	--



## **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.

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

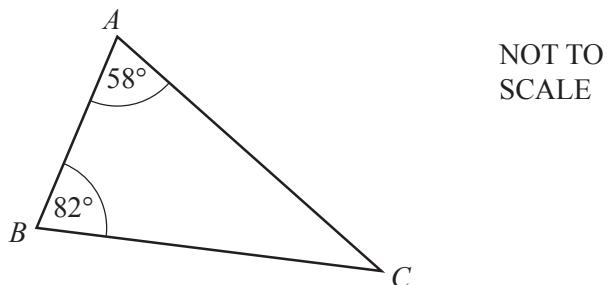
..... [1]

- 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



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  $457\,000 \text{ cm}^2$  into  $\text{m}^2$ .

.....  $\text{m}^2$  [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  $l$ .

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

- 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.

$$\dots [3]$$

- 10 Solve the simultaneous equations.

You must show all your working.

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

$$x = \dots$$

$$y = \dots [3]$$

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.

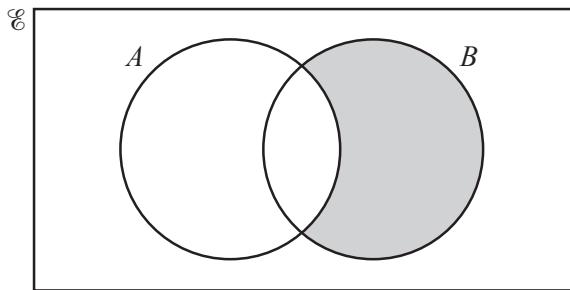
(....., ....) [2]

- (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.  $(4xy^2)^3$

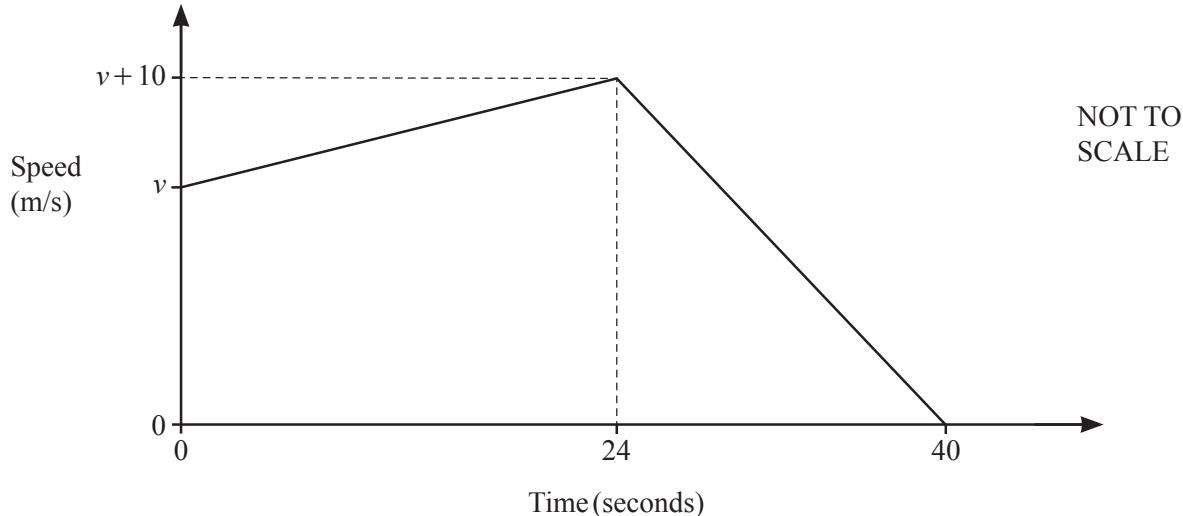
..... [2]

(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  $v$ .

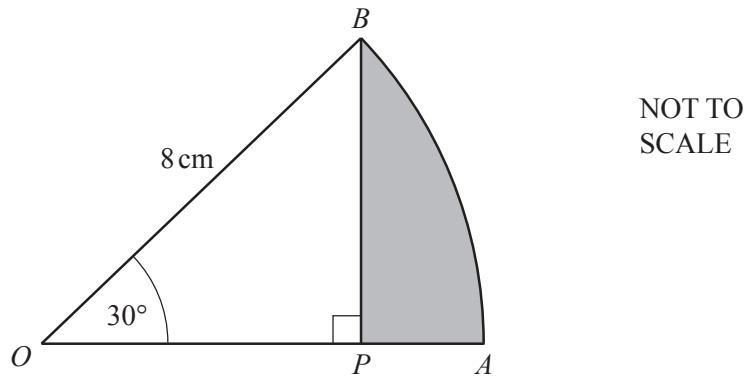
$v =$  ..... [4]

20 Factorise.

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

..... [2]

21

NOT TO  
SCALE $OAB$  is the sector of a circle, centre  $O$ . $OB = 8 \text{ cm}$  and angle  $\angle AOB = 30^\circ$ . $BP$  is perpendicular to  $OA$ .

- (a) Calculate  $AP$ .

$$AP = \dots \text{ cm} \quad [3]$$

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

$$\dots \text{ cm}^2 \quad [3]$$

- 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  $x$ .

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

- 24 Simplify.

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

$$\dots \quad [4]$$

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

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

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

---

Permission to reproduce items where third-party owned material protected by copyright is included has been sought and cleared where possible. Every reasonable effort has been made by the publisher (UCLES) to trace copyright holders, but if any items requiring clearance have unwittingly been included, the publisher will be pleased to make amends at the earliest possible opportunity.

To avoid the issue of disclosure of answer-related information to candidates, all copyright acknowledgements are reproduced online in the Cambridge Assessment International Education Copyright Acknowledgements Booklet. This is produced for each series of examinations and is freely available to download at [www.cambridgeinternational.org](http://www.cambridgeinternational.org) after the live examination series.

Cambridge Assessment International Education is part of the Cambridge Assessment Group. Cambridge Assessment is the brand name of the University of Cambridge Local Examinations Syndicate (UCLES), which itself is a department of the University of Cambridge.