



# Cambridge IGCSE™

CANDIDATE  
NAME

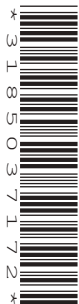
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CENTRE  
NUMBER

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**MATHEMATICS**

**0580/23**

Paper 2 (Extended)

**October/November 2023**

**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.

- 1 Tara goes on a journey by train.  
The train leaves at 0648.  
The journey takes 12 hours and 35 minutes.

Find the time when Tara arrives.

..... [1]

2

61	63	64	66	68	69
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From this list, write down

- (a) a cube number

..... [1]

- (b) a prime number.

..... [1]

- 3 The stem-and-leaf diagram shows the heights, in centimetres, of some plants.

10	4 8
11	1 3 4 6
12	2 3 6 9
13	2 6 9

Key: 10|4 represents 10.4 cm

- (a) Find the median height.

..... cm [1]

- (b) Work out the mean height.

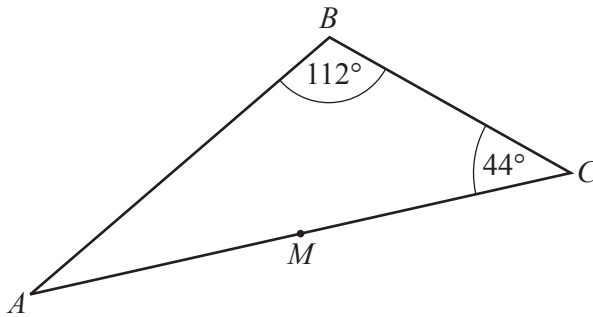
..... cm [2]

- 4 Shubhu invests \$750 in a savings account for 5 years.  
The account pays simple interest at a rate of 1.8% per year.

Calculate the total interest she earns during the 5 years.

\$ ..... [2]

5



NOT TO SCALE

The diagram shows triangle  $ABC$ .  
 $M$  is the midpoint of  $AC$ .

Triangle  $ABC$  is rotated  $180^\circ$  about centre  $M$ .  
The image and the original triangle together form a quadrilateral  $ABCD$ .

- (a) Write down the mathematical name of the quadrilateral  $ABCD$ .

..... [1]

- (b) Find angle  $BAD$ .

Angle  $BAD =$  ..... [2]

- 6 Rama asks a group of students how they travel to school.  
The table shows the probability of how a student, chosen at random, travels to school.

	Bus	Walk	Car	Other
Probability	0.4	0.32	0.17	

- (a) Complete the table.

[2]

- (b) There are 1800 students at the school.

Find the expected number of students that walk to school.

..... [1]

- 7 **Without using a calculator**, work out  $1\frac{5}{6} \div \frac{11}{15}$ .

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

..... [3]

8 Find the highest common factor (HCF) of 48 and 80.

..... [2]

9  $P = \frac{2wy^2}{3}$

Find the positive value of  $y$  when  $P = 108$  and  $w = 8$ .

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

10  $\vec{AB} = \begin{pmatrix} 7 \\ -3 \end{pmatrix}$

(a) Find  $3\vec{AB}$ .

$\begin{pmatrix} \phantom{0} \\ \phantom{0} \end{pmatrix}$  [1]

(b) Find  $|\vec{AB}|$ .

$|\vec{AB}| =$  ..... [2]

- 11 A bronze sphere has radius 3.6 cm.  
The density of bronze is  $8.05 \text{ g/cm}^3$ .

Find the mass of the sphere.

Give your answer **in kilograms**, correct to the nearest gram.

[The volume,  $V$ , of a sphere with radius  $r$  is  $V = \frac{4}{3}\pi r^3$ .]

[Density = mass  $\div$  volume.]

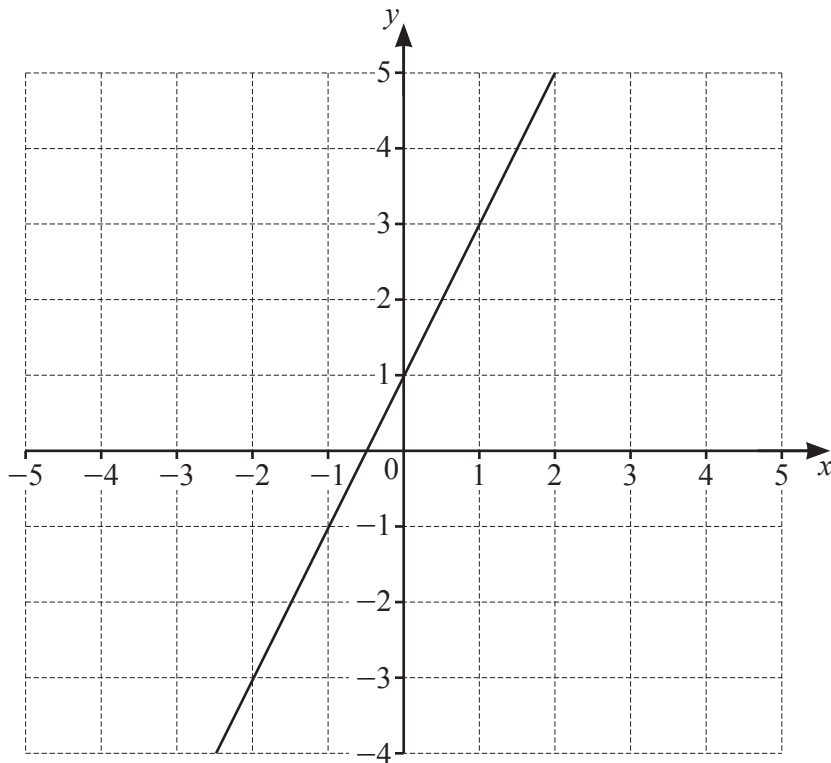
..... kg [4]

- 12 Oliver sent 22% more messages in June than in May.  
He sent 305 messages in June.

Find how many more messages he sent in June than in May.

..... [3]

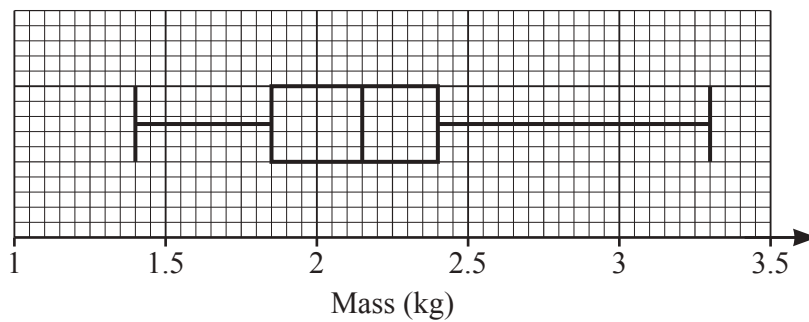
13 The graph of  $y = 2x + 1$  is drawn on the grid.



By shading the **unwanted** regions of the grid, find and label the region R which satisfies these inequalities.

$$y \geq 2x + 1 \qquad y \geq 1 \qquad 4x + 3y < 12 \qquad [4]$$

14 The box-and-whisker plot shows information about the mass, in kg, of some parcels.



(a) Find the mass of the heaviest parcel.

..... kg [1]

(b) Find the interquartile range.

..... kg [1]

15  $T = \sqrt{3d - e}$

Rearrange the formula to make  $d$  the subject.

$d = \dots\dots\dots$  [3]

16 A cylinder with height 12.5 cm has a curved surface area of  $105\pi \text{ cm}^2$ .

Calculate the volume of the cylinder.

$\dots\dots\dots \text{ cm}^3$  [4]

17 (a) Simplify.

$$(64y^{27})^{\frac{2}{3}}$$

$\dots\dots\dots$  [2]

(b) Simplify.

$$\frac{x - 5}{x^2 - 25}$$

$\dots\dots\dots$  [2]

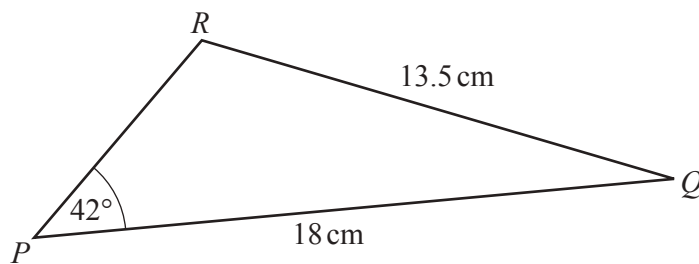


18  $F$  is proportional to the product of  $m$  and  $a$ .

Calculate the percentage change in  $F$  when  $m$  is increased by 40% and  $a$  is decreased by 15%.

..... % [3]

19



NOT TO  
SCALE

Calculate the obtuse angle  $PRQ$ .

Angle  $PRQ =$  ..... [4]

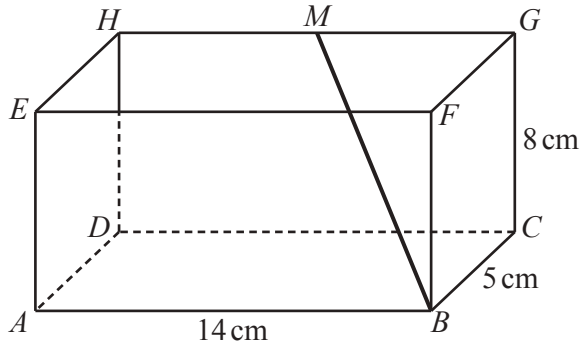
20  $(x+a)(x+2)(2x+3)$  is equivalent to  $2x^3 + bx^2 + cx - 18$ .

Find the value of each of  $a$ ,  $b$  and  $c$ .

$a =$  .....

$b =$  .....

$c =$  ..... [3]



NOT TO  
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The diagram shows a cuboid  $ABCDEFGH$ .  
 $AB = 14$  cm,  $BC = 5$  cm and  $CG = 8$  cm.  
 $M$  is the midpoint of  $HG$ .

(a) Calculate  $BM$ .

..... cm [3]

(b) Calculate the angle that  $BM$  makes with the base  $ABCD$ .

..... [3]

Question 22 is printed on the next page.

- 22 Find the coordinates of the point where the line  $4x + y = 9$  intersects the curve  $y + x^2 = 5$ .  
You must show all your working.

( ..... , ..... ) [5]

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