



# Cambridge IGCSE™

CANDIDATE  
NAME



CENTRE  
NUMBER

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CANDIDATE  
NUMBER

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**MATHEMATICS**

**0580/23**

Paper 2 (Extended)

**October/November 2024**

**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

|    |    |    |    |    |    |    |    |    |
|----|----|----|----|----|----|----|----|----|
| 61 | 62 | 63 | 64 | 65 | 66 | 67 | 68 | 69 |
|----|----|----|----|----|----|----|----|----|

From the list of numbers, write down

(a) a cube number

..... [1]

(b) a prime number.

..... [1]

2 A train journey starts at 23 30 and finishes at 07 15 the next day.

Find the time taken for this journey.

..... h ..... min [1]

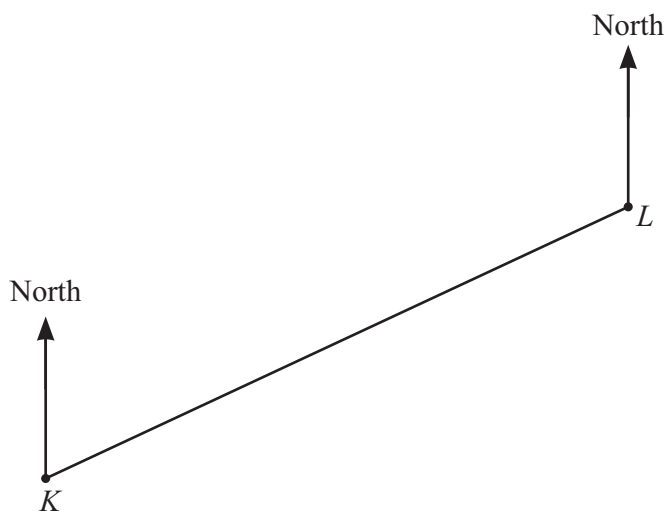
3 Simplify.

$$3p - t - p - 4t$$

..... [2]



- 4 The scale drawing shows the positions of town  $K$  and town  $L$ .  
The scale is 1 cm represents 10 km.



Scale : 1 cm to 10 km

- (a) Find the actual distance between town  $K$  and town  $L$ .

..... km [2]

- (b) Measure the bearing of town  $L$  from town  $K$ .

..... [1]





- 5 Each student in a class of 20 students records the number of coins in their pockets. The table shows the results.

|                 |   |   |   |   |   |   |   |
|-----------------|---|---|---|---|---|---|---|
| Number of coins | 0 | 1 | 2 | 3 | 4 | 5 | 6 |
| Frequency       | 3 | 1 | 7 | 8 | 0 | 0 | 1 |

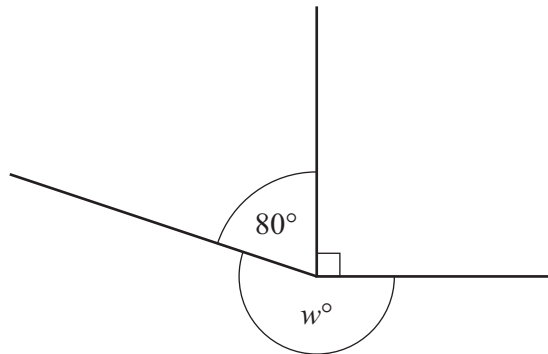
(a) Find the median.

..... [1]

(b) Calculate the mean.

..... [3]

6



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The diagram shows three lines meeting at a point.

Find the value of  $w$ .

$w =$  ..... [1]

7 Solve the equation.

$$7 - h = 3 - 5h$$

$h =$  ..... [2]





- 8 Sacha buys  $b$  books and  $m$  magazines.  
The cost of each book is \$12 and the cost of each magazine is \$5.

Write an expression, in terms of  $b$  and  $m$ , for the total cost of the books and the magazines.

\$ ..... [2]

- 9 Find the size of an interior angle of a regular 15-sided polygon.

..... [2]

- 10 **Without using a calculator**, work out  $2\frac{1}{4} - 1\frac{11}{12}$ .

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

..... [3]





11 Solve the simultaneous equations.

$$3p - 2q = 7$$

$$p + 2q = 1$$

$$p = \dots\dots\dots$$

$$q = \dots\dots\dots [2]$$

12  $V = \sqrt[3]{\frac{x}{y}}$

Rearrange the formula to write  $x$  in terms of  $V$  and  $y$ .

$$x = \dots\dots\dots [2]$$

13 Find the  $n$ th term of each sequence.

(a) 21, 13, 5, -3, -11, ...

$$\dots\dots\dots [2]$$

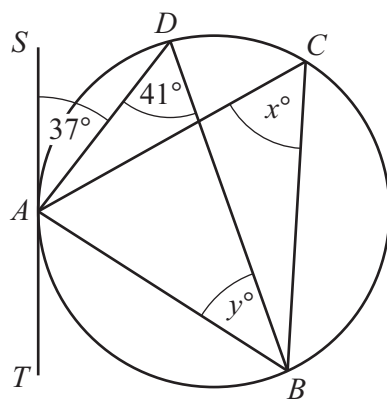
(b) 2.5, 5, 10, 20, 40, ...

$$\dots\dots\dots [2]$$





14 (a)



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$A, B, C$  and  $D$  lie on the circle.  
 $TAS$  is a tangent to the circle at  $A$ .

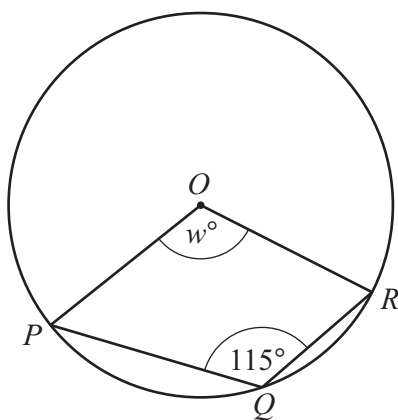
(i) Find the value of  $x$ .

$x = \dots\dots\dots$  [1]

(ii) Find the value of  $y$ .

$y = \dots\dots\dots$  [1]

(b)



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$P, Q$  and  $R$  lie on the circle, centre  $O$ .

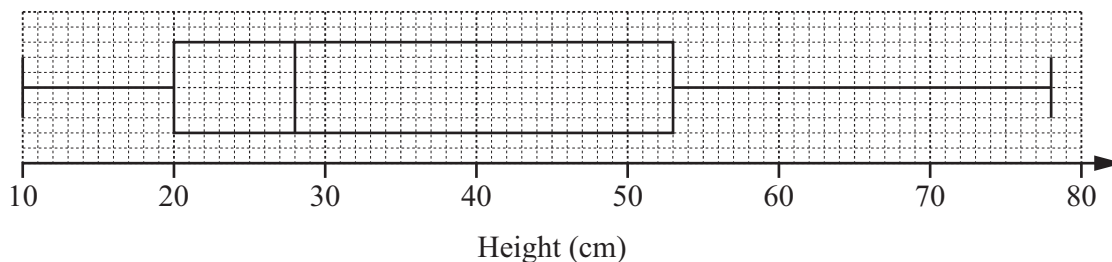
Find the value of  $w$ .

$w = \dots\dots\dots$  [2]





15



The box-and-whisker diagram shows information about the heights of some plants.

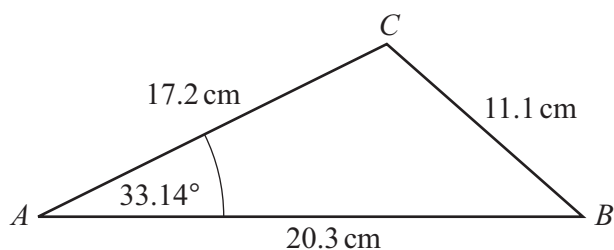
(a) Find the median height.

..... cm [1]

(b) Find the interquartile range of the heights.

..... cm [1]

16



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Calculate the shortest distance from  $C$  to  $AB$ .

..... cm [3]

17 Simplify.

(a)  $18x^{18} \div 3x^3$

..... [2]

(b)  $(125y^{75})^{\frac{2}{3}}$

..... [2]





- 18 Two mathematically similar solids have volumes  $81 \text{ cm}^3$  and  $24 \text{ cm}^3$ .  
The height of the smaller solid is  $4.8 \text{ cm}$ .

Calculate the height of the larger solid.

..... cm [3]

- 19  $y$  is inversely proportional to  $\sqrt{x+2}$ .  
When  $x = 2$ ,  $y = 3$ .

Find  $y$  in terms of  $x$ .

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

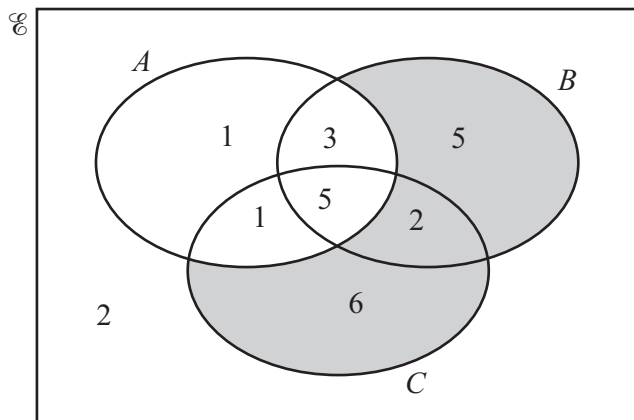
- 20 Solve the equation  $\tan x + 2 = 0$  for  $0^\circ \leq x \leq 360^\circ$ .

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





21



The Venn diagram shows the number of elements in each region.

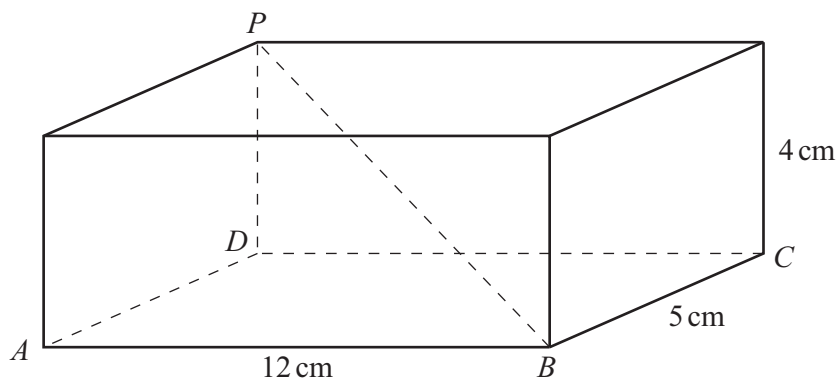
(a) Use set notation to describe the shaded region.

..... [1]

(b) Find  $n(A \cap B \cap C)$ .

..... [1]

22



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The diagram shows a cuboid with a diagonal  $PB$ .

Calculate the angle between the diagonal  $PB$  and the base  $ABCD$ .

..... [4]





23 Write  $x^2 + 8x - 7$  in the form  $(x + a)^2 + b$ .

..... [2]

24 A rectangle has an area of  $150 \text{ m}^2$ , correct to the nearest square metre.  
The length of the rectangle is 22 m, correct to the nearest metre.

Calculate the upper bound of the width of the rectangle.

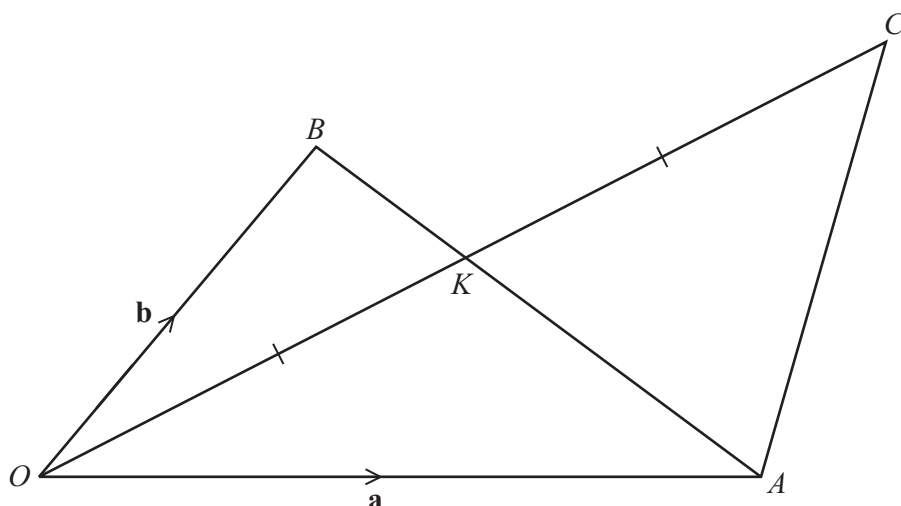
..... m [3]

25 Simplify.

$$\frac{3x - 2 - 3xy + 2y}{1 - y^2}$$

..... [4]





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In the diagram,  $\overrightarrow{OA} = \mathbf{a}$  and  $\overrightarrow{OB} = \mathbf{b}$ .

$AK : KB = 2 : 1$ .

$OK = KC$ .

Find  $\overrightarrow{AC}$  in terms of  $\mathbf{a}$  and  $\mathbf{b}$ .

Give your answer in its simplest form.

$\overrightarrow{AC} = \dots\dots\dots [4]$

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