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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 π , 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.

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

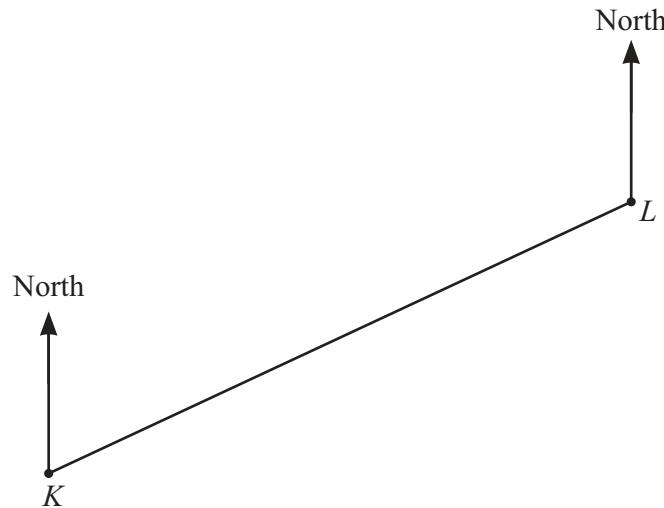
..... [2]

DO NOT WRITE IN THIS MARGIN





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 |

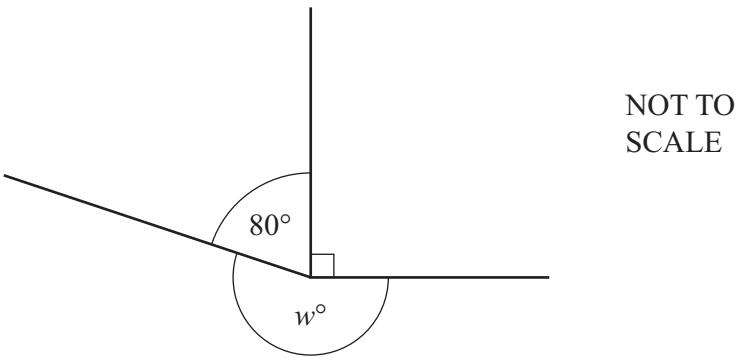
(a) Find the median.

..... [1]

(b) Calculate the mean.

..... [3]

6



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.

$$\begin{aligned}3p - 2q &= 7 \\ p + 2q &= 1\end{aligned}$$

$$p = \dots$$

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

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

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

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

13 Find the n th term of each sequence.

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

$$\dots \quad [2]$$

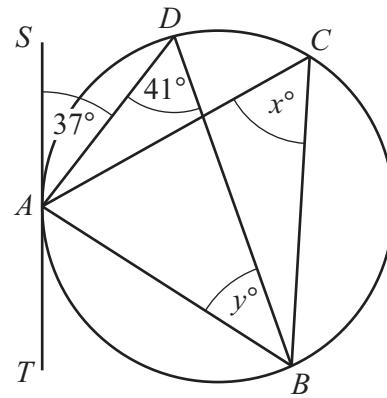
(b) 2.5, 5, 10, 20, 40, ...

$$\dots \quad [2]$$





14 (a)

NOT TO
SCALE

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

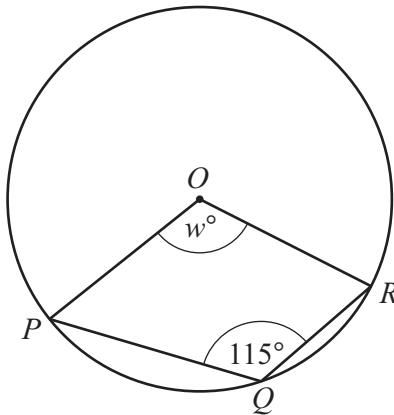
(i) Find the value of x .

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

(ii) Find the value of y .

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

(b)

NOT TO
SCALE

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

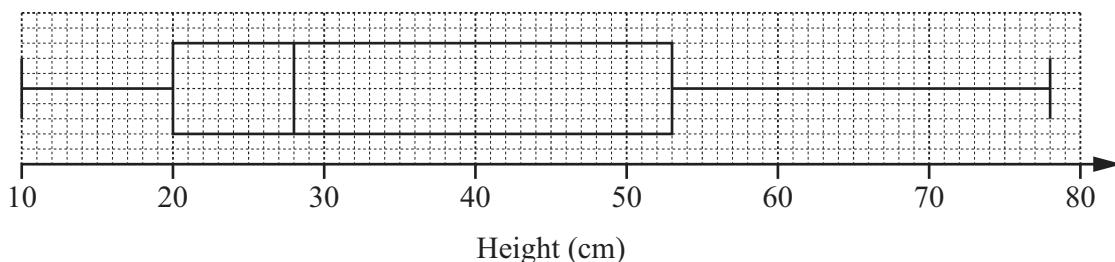
Find the value of w .

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





15



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

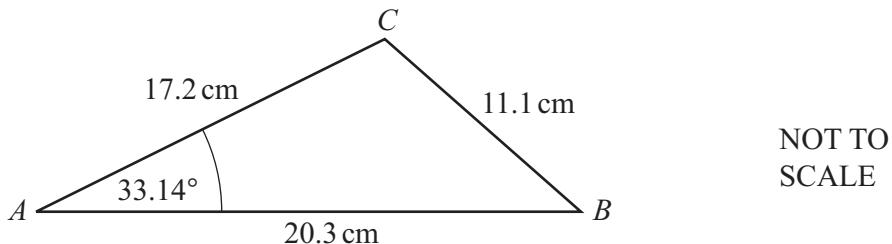
(a) Find the median height.

..... cm [1]

(b) Find the interquartile range of the heights.

..... cm [1]

16



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 cm^3 and 24 cm^3 .
The height of the smaller solid is 4.8 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]

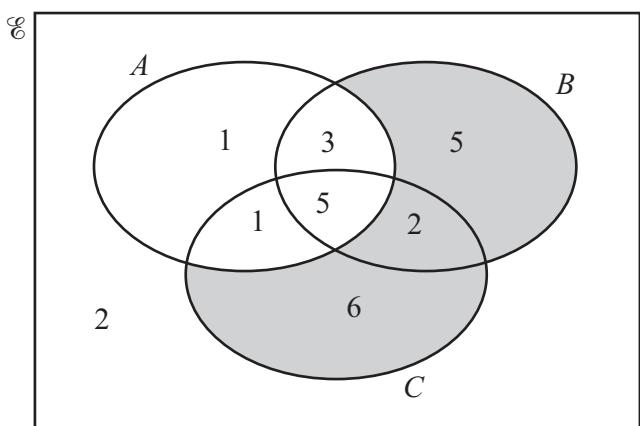
20 Solve the equation $\tan x + 2 = 0$ for $0^\circ \leq x \leq 360^\circ$.

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





21



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

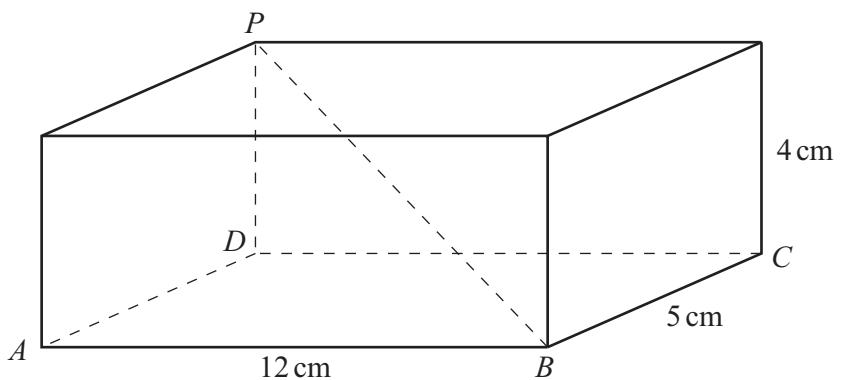
(a) Use set notation to describe the shaded region.

..... [1]

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

..... [1]

22



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 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.

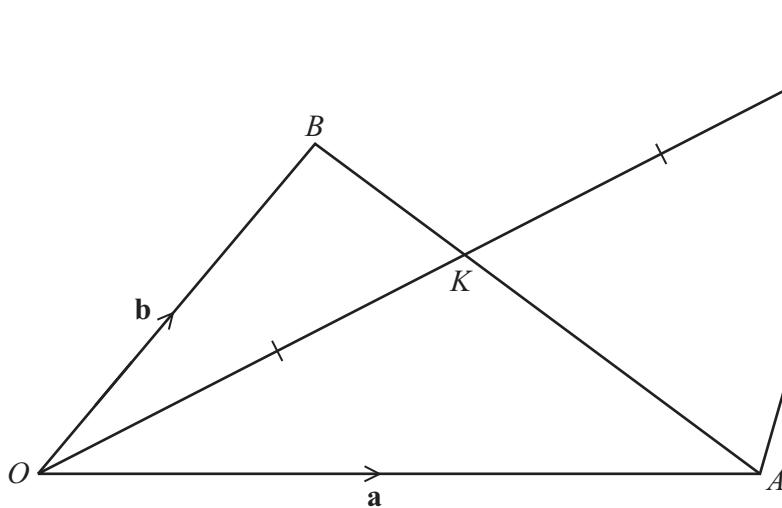
..... m [3]

25 Simplify.

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

..... [4]



NOT TO
SCALE

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.

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

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