



# Mathematics

Stage 8

Paper 2

**2024**

## Cambridge Lower Secondary Progression Test

Name

Class

Date

**1 hour**

Additional materials: Calculator  
Geometrical instruments  
Tracing paper (optional)

### INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.
- You may use a calculator.

### INFORMATION

- The total mark for this paper is 50.
- The number of marks for each question or part question is shown in brackets [ ].

- 1 Naomi is  $y$  years old. Rajiv is twice as old as Naomi was 3 years ago. Write an expression, in terms of  $y$ , for Rajiv's age.

..... [1]

- 2 Rajiv sells three different sizes of cups of coffee in the ratio

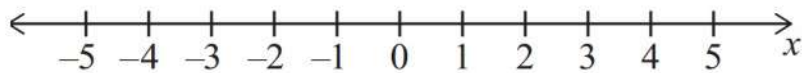
$$\text{large} : \text{medium} : \text{small} = 3 : 9 : 2$$

He sells 238 cups of coffee in total.

Work out how many **small** cups of coffee Rajiv sells.

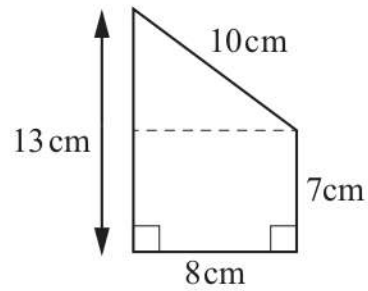
..... [2]

- 3 Represent  $x < 1$  on the number line.



[1]

- 4 Here is a compound shape made from a triangle and a rectangle.



NOT TO  
SCALE

Anastasia wants to work out the area of this shape.

Draw a ring around the side length she does **not** need to use.

7 cm

8 cm

10 cm

13 cm

[1]

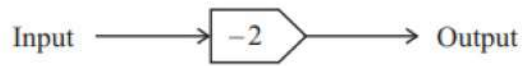
- 5 Gabriella says,

‘I start with a number, I square it and the answer is 169’

Find the two possible numbers Gabriella could have started with.

..... and ..... [1]

- 6 Here is a function machine.



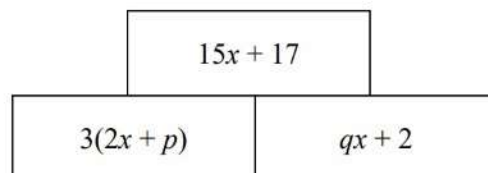
- (a) Find the **output** when the input is 15

..... [1]

- (b) Find the **input** when the output is 40

..... [1]

- 7 In the diagram, the expression on the top row is the sum of the two expressions on the second row.



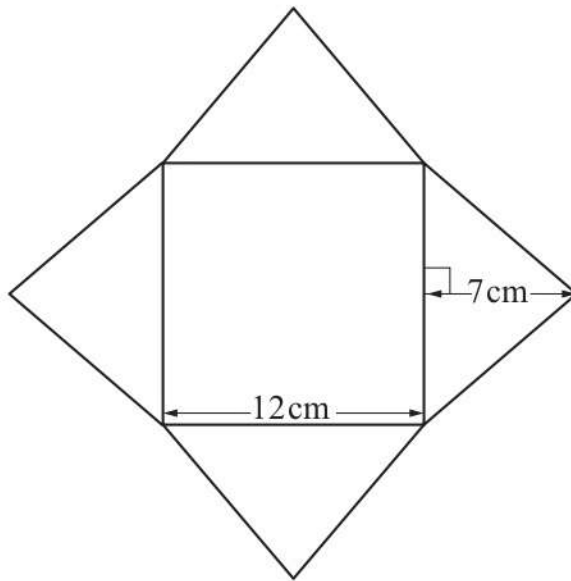
Find the value of  $p$  and the value of  $q$ .

[2]

$p =$  .....

$q =$  .....

- 8 Here is the net of a square-based pyramid.



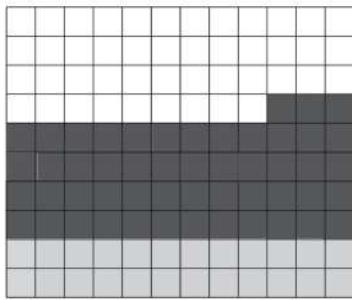
NOT TO  
SCALE

The top vertex of the pyramid is directly above the centre of the base.

Calculate the total surface area of the pyramid.

..... $\text{cm}^2$  [2]

- 9 The waffle diagram shows the proportions of students in a school with and without brothers and sisters.



**Key**

- no brothers or sisters
- one brother or sister
- more than one brother or sister

- (a) Calculate the percentage of students with **no brothers or sisters**.

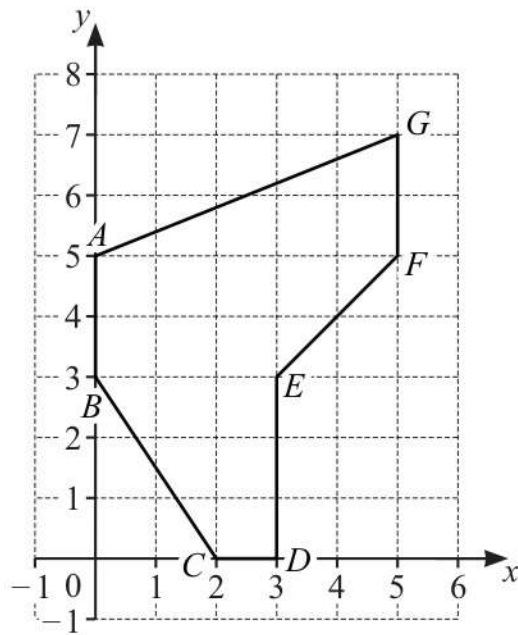
.....% [2]

- (b) A pie chart is drawn to show the same information as the waffle diagram.

Work out the angle on the pie chart representing the proportion of students with **one brother or sister**.

.....° [2]

10 The diagram shows shape  $ABCDEFGG$  drawn on a grid.



(a) Match each equation to the correct line.

	Line through $F$ and $G$
$y = 3$	Line through $C$ and $D$
$x = 0$	Line through $D$ and $E$
$x = 5$	Line through $B$ and $E$
$y = 0$	Line through $A$ and $F$
	Line through $A$ and $B$

[2]

(b) Write down the equation of the line through  $E$  and  $F$ .

..... [1]

11 (a) Here are the second, third and fourth terms in a linear sequence.

... 1      - 4      - 9      ...

(i) Write down the first and fifth terms in the sequence.

..... [2]  
 first term      fifth term

(ii) Describe the term-to-term rule for the sequence.

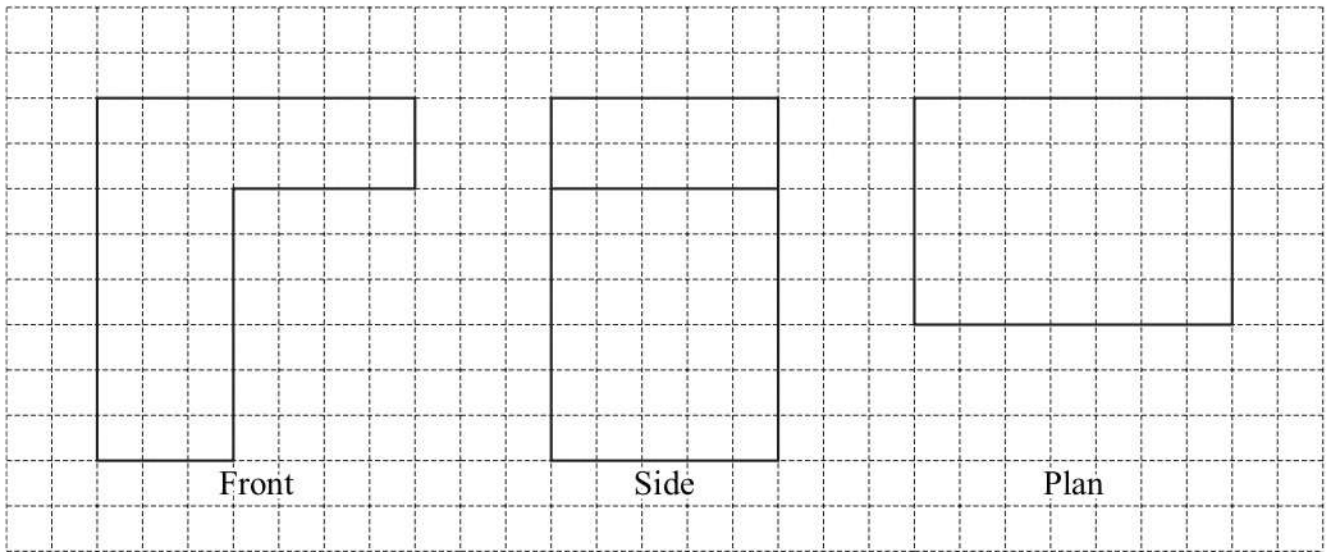
..... [1]

(b) The  $n$ th term of a different sequence is  $7n$ .  
 Find the 9th term in this sequence.

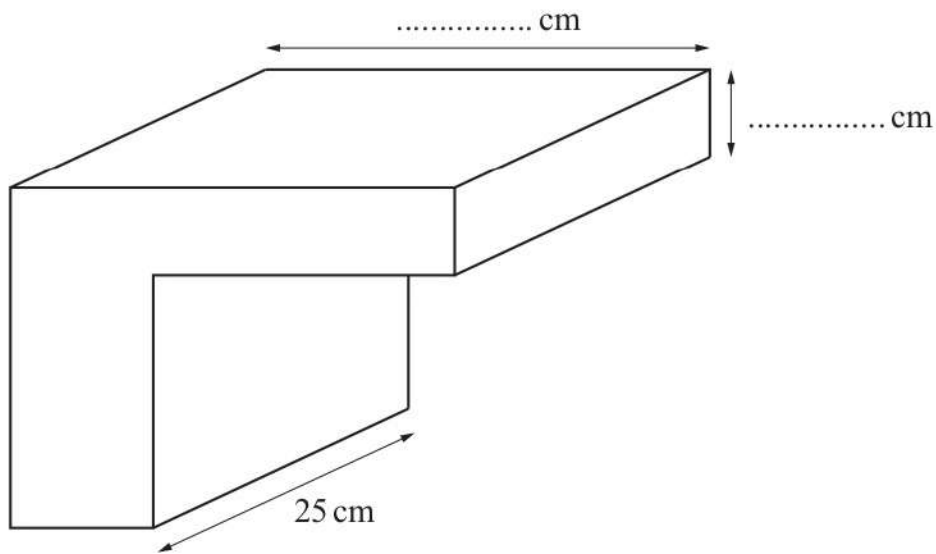
..... [1]



12 Ahmed makes these scale drawings of the front view, side view and plan view of a prism.



He then sketches this 3D-drawing of the prism.



NOT TO SCALE

Work out the **two** missing lengths in the 3D-drawing.  
Write your answers on the drawing.

[2]

13 Here is a function machine.

$$\text{Input } (x) \rightarrow \boxed{\times 3} \rightarrow \boxed{-5} \rightarrow \text{Output } (y)$$

Complete the table showing inputs and outputs for the function machine.

<b>Input (x)</b>	<b>Output (y)</b>
-10	
	7

[2]

14 A box contains green, red and black pens only.

The proportion of the pens that are green is  $\frac{5}{12}$

The proportion of the pens that are red is  $\frac{1}{3}$

Find the ratio of green to red to black pens.

Give the ratio in its simplest form.

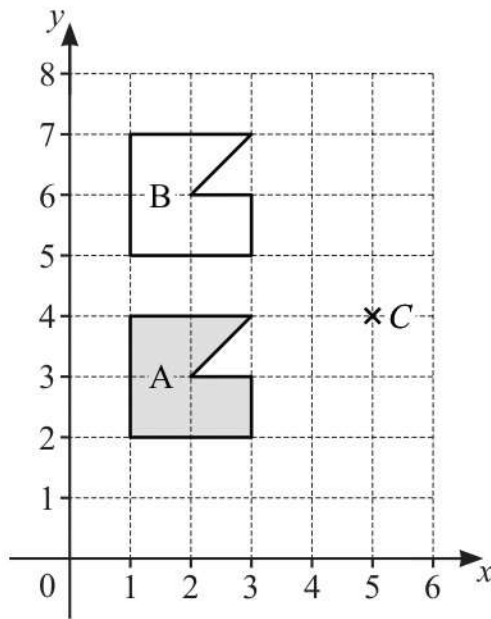
..... : ..... : ..... [2]

15 The circumference of a circle is 136.4cm.

Calculate the radius of the circle.

..... cm [2]

16 The grid shows shape A, shape B and point C.



(a) Write down the vector that translates shape A onto shape B.

$$\begin{pmatrix} \dots \\ \dots \end{pmatrix} \quad [1]$$

(b) Point C is translated to point D by vector  $\begin{pmatrix} -25 \\ 40 \end{pmatrix}$ .

Write down the vector that translates point D onto point C.

$$\begin{pmatrix} \dots \\ \dots \end{pmatrix} \quad [1]$$

(c) Point C is reflected in the line  $x = 6$  to give point E.

Find the coordinates of point E.

( ..... , ..... ) [1]

17 Complete these sentences with the correct rounded number.

307 021 correct to 2 significant figures is .....

0.0389647 correct to 3 significant figures is .....

[2]

18 (a) Complete these sentences about percentage change with the correct numbers.

To increase a value by 4% you multiply by the decimal .....

To increase a value by .....% you multiply by 2

[2]

(b) Complete this sentence about absolute change with the correct number.

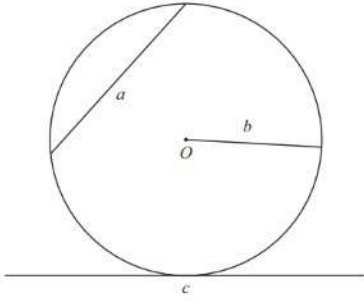
When 150 is decreased by 300% the absolute change is .....

[1]

19 Find the value of  $20 - \frac{p}{4}$  when  $p = 8$

.....[1]

- 20 Here is a circle with the centre marked O.



Write down the mathematical name for each of the lines  $a$ ,  $b$  and  $c$ .

Line  $a$  = .....

Line  $b$  = .....

Line  $c$  = .....

[2]

- 21 (a) Solve.

$$5x = 35$$

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

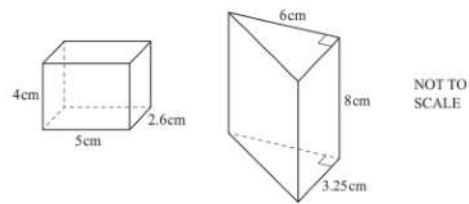
[1]

- (b) Solve.  $17 - 4y = 5$

$$y = \dots\dots\dots$$

[2]

- 22 The diagram shows a cuboid container and a triangular prism container.  
The cross-section of the triangular prism is a right-angled triangle.



The cuboid is completely filled with water.

The water is poured from the cuboid into the empty triangular prism.

Calculate the fraction of the triangular prism that is filled by the water.

Give your answer in its simplest form.

..... [4]

23 Draw a ring around the three values that are equivalent to each other.

$\frac{2}{5}$      $\frac{4}{100}$     0.04    20%    4%    0.25    |

..... [1]

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