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 Expand the brackets.

$$5x(x + 4)$$

.... [1]

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

large : medium : small = 3 : 9 : 2

He sells 238 cups of coffee in total.

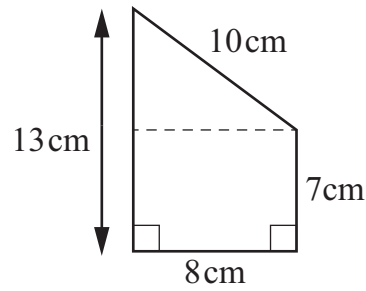Work out how many **small** cups of coffee Rajiv sells.

.... [2]

3 Here is an inequality.

$$x \leq 7$$

Write down the greatest possible value of x.

$x = $ .... [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 A vase contains flowers that are white or red or pink only.
A flower is picked at random from the vase.
The probabilities of picking each colour of flower are shown in the table.

White	Red	Pink
0.15	0.05	0.8

Find the probability of **not** picking a red flower.

.... [1]

7 Rearrange the formula to make x the subject.

$$m = \frac{x + y}{2}$$

$x =$ .... [2]

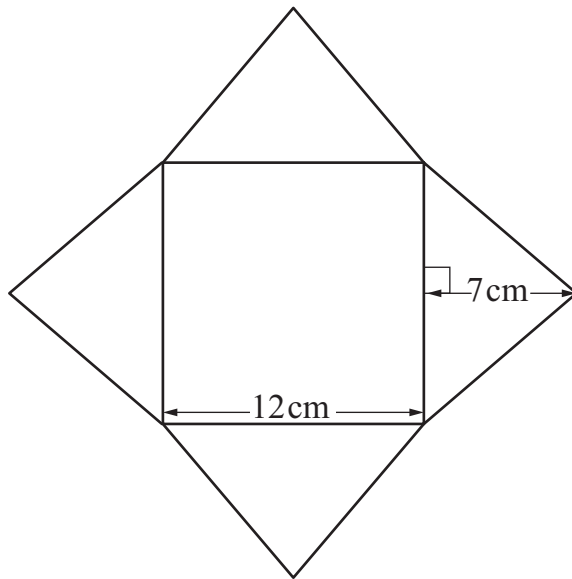**8** An expression, in cm, for the width of a rectangle is $x + 3$
The length of the rectangle is twice the width.

Find, in terms of x, an expression for the perimeter of the rectangle.
Give your answer in its simplest form.

.... cm [2]

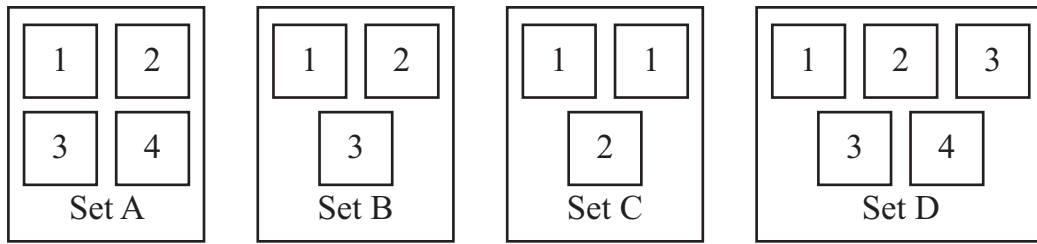**9** Here is the net of a square-based pyramid.

NOT TO SCALE

7 cm

12 cm

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

Calculate the total surface area of the pyramid.

.... cm^2 [2]

M/S8/02

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10 Yuri has four sets of numbered cards, A, B, C and D.

1 2	1 2	1 1	1 2 3
3 4	3	2	3 4
Set A	Set B	Set C	Set D

(a) Yuri chooses **one** of the sets of cards.
He picks one card at random from this set and replaces it.
He does this a total of 600 times from the same set.
Yuri picks the number 1 a total of 118 times.

Draw a ring around the set Yuri is most likely to have chosen.

Set A   Set B   Set C   Set D

[1]

(b) Yuri picks one card at random from set A and one card at random from set C.
He adds the numbers on the two cards together.

(i) He starts to draw this sample space diagram to show all the possible outcomes.

		Set C		
	+	1		
Set A	1			
	2			
	3	4		
	4			

Complete the diagram.

[2]

(ii) Find the probability Yuri gets a total of 3 when he adds the numbers on his two cards together.

.... [1]

11 The diagram shows shape *ABCDEFG* drawn on a grid.
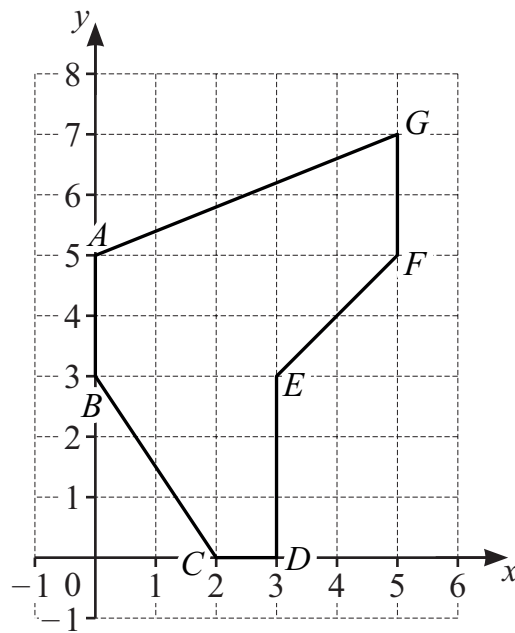
(a) Match each equation to the correct line.

	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]

12 Mia writes down five whole numbers.

She picks one of the numbers at random.
Outcome E is she picks an even number.
Outcome O is she picks an odd number.

Tick (✓) to show if each of these statements must be true, could be true or must be false.

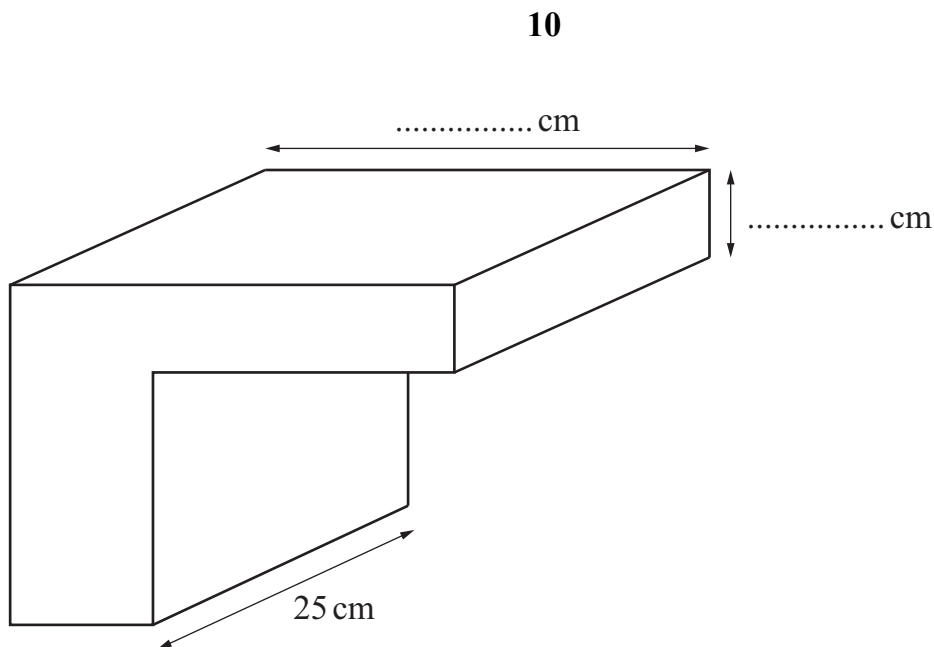|	Must be true	Could be true	Must be false
Outcome E is more likely to happen than outcome O	☐	☐	☐
Outcome E and outcome O can happen at the same time	☐	☐	☐

[1]

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

Front   Side   Plan
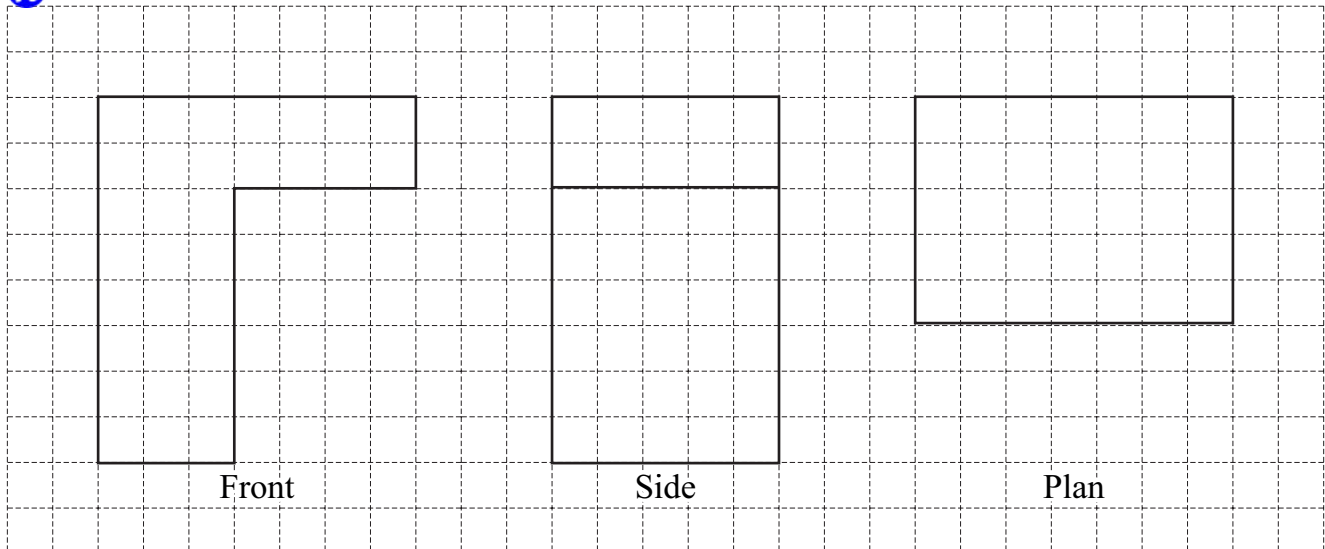
He then sketches this 3D-drawing of the prism.
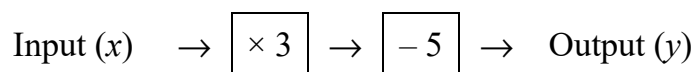
.... cm

.... cm

NOT TO
SCALE

25 cm

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

[2]

14 Here is a function machine.

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

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

Input (x)	Output (y)
–10	
	7

[2]

15 Lily wants to investigate the favourite gym equipment of members of her gym.

(a) There are 700 adults and 50 children who are members of her gym.
Lily decides to sample 30 adults and 30 children.

Give one reason why this may **not** be an appropriate sample to choose.

....

.... [1]

(b) Lily decides to interview the members of her sample instead of giving them a questionnaire.

Write down one advantage of this method.

....

.... [1]

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

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

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

Find the ratio of green to red to black pens.
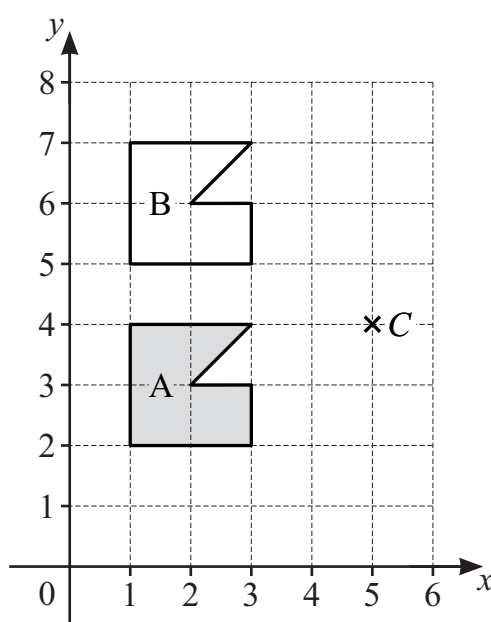Give the ratio in its simplest form.

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

17 The circumference of a circle is 136.4 cm.

Calculate the radius of the circle.

.... cm [2]

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

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

$$\begin{pmatrix} \text{...........} \\ \text{...........} \end{pmatrix}$$

[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.

$$\begin{pmatrix} \text{...........} \\ \text{...........} \end{pmatrix}$$

[1]

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

Find the coordinates of point E.

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

19 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]

20 (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]

21 Mike writes three equations where

- h represents the number of hours
- d represents the number of days
- m represents the number of months
- y represents the number of years

Tick (✓) to show if each of his equations is always true, sometimes true or false.
One has been done for you.

	Always true	Sometimes true	False
$d = 24h$			✓
$m = 12y$			
$d = 31m$			

[1]

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22 Angelique has some red tickets and some yellow tickets.
Each ticket has a single number written on it.
The table shows information about her tickets.

Colour of the ticket	Numbers used on the tickets
red	1 to 27
yellow	1 to 20

Angelique picks a ticket at random.
She writes these sentences about the ticket she picks, each with an incorrect fraction.

The probability that my ticket is red is $\dfrac{1}{2}$

The probability that my ticket shows an even number is $\dfrac{1}{2}$

Complete her sentences with the correct fractions.

The probability that my ticket is red is ....

The probability that my ticket shows an even number is ....

[2]

23 Solve.

$$5(4x + 3) = 97 - 8(0.5 - x)$$

$x =$ .... [3]

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

4cm

5cm

2.6cm

6cm

8cm

3.25cm

NOT TO SCALE
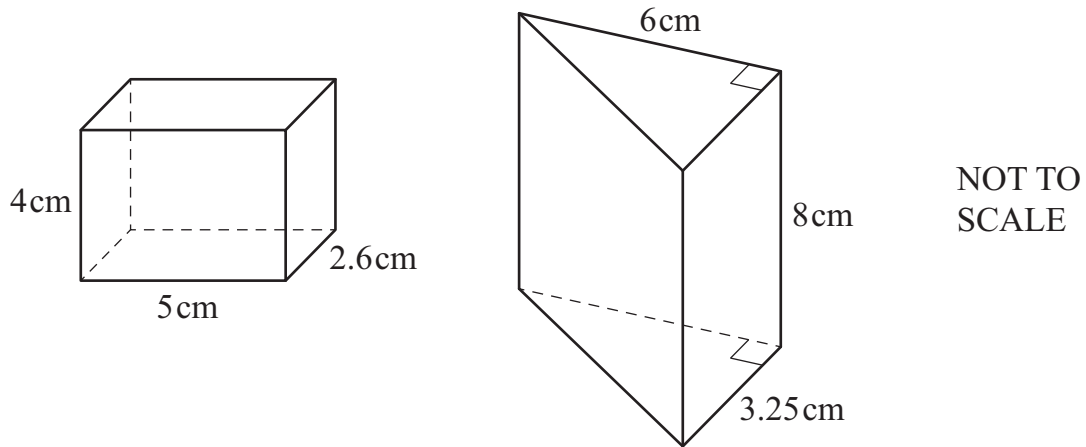
The cuboid is completely filled with water.
The water is poured from the cuboid into the empty triangular prism.

Calculate the **fraction** of the triangular prism that is filled by the water.
Give your answer in its simplest form.

.... [4]

25 Here is an equation.

$$8 - x + y = 20$$

Choose the correct words and the correct number to complete the sentence.

greater than less than		8 20 12 28

x is .... y by .... [1]