Cambridge Assessment International Education

Mathematics

Stage 9

Paper 1 **2022**

Cambridge Lower Secondary Progression Test

Name

Class

Date

1 hour

Additional materials: Geometrical instruments
Tracing paper (optional)

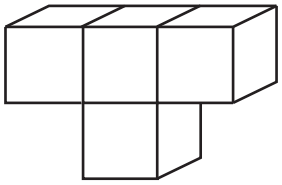
INSTRUCTIONS

- Answer **all** questions.
- Write your answer to each question in the space provided.
- You should show all your working on the question paper.
- You are **not** allowed to 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 A prism is made from four identical cubes.



Tick (✓) to show the number of planes of symmetry the prism has.

1 ☐ 2 ☐ 3 ☐ 4 ☐

[1]

2 A bag contains pencils of four different colours.
Here are some of the probabilities of picking a pencil of each colour.

	Red	**Yellow**	**Blue**	**Green**
Probability	0.35	0.25	0.1	

(a) Find the probability of picking a pencil that is red or yellow.

..... [1]

(b) Complete the table.

[1]

3 Solve.

$$\frac{12}{x} = 3$$

$x =$ ..... [1]

4 Use a straight edge and compasses only to construct an equilateral triangle ABC.
The side AB has been drawn for you.
Do **not** rub out your construction arcs.

[1]

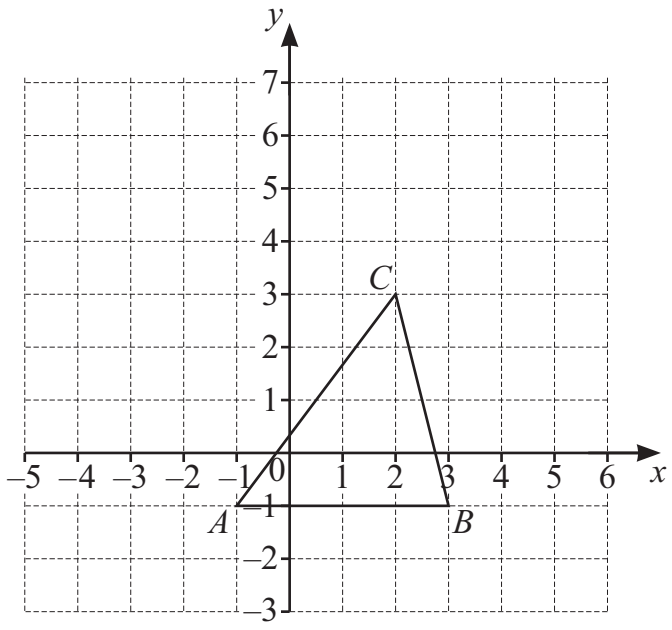
5 Here are some pairs of events.

Tick (✓) to show if each pair of events is independent or **not** independent.

		Independent	**Not** independent
Pick a disk from a box at random and replace it.	Pick another disk from the same box at random.	☐	☐
Pick a disk from a box at random and do **not** replace it.	Pick another disk from the same box at random.	☐	☐
Pick a disk from a box at random and do **not** replace it.	Roll a dice.	☐	☐

[1]

6 The diagram shows triangle ABC drawn on a grid.



The triangle ABC is enlarged by a scale factor of 2 from centre of enlargement $(0, 0)$.

Find the coordinates of the new position of vertex C.

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

7 A circle has a radius of 3 cm.

Tick (✓) to show the area of the circle correct to the nearest cm^2.

6		9		18		28		81	

[1]

8 Find the value of $\frac{4-3x}{x} + 8$ when $x = 2$

..... [1]

9 A rectangle has an area of $8\,\text{cm}^2$.
The sides of the rectangle are enlarged by a scale factor of 3

Find the area of the enlarged rectangle.

..... cm^2 [1]

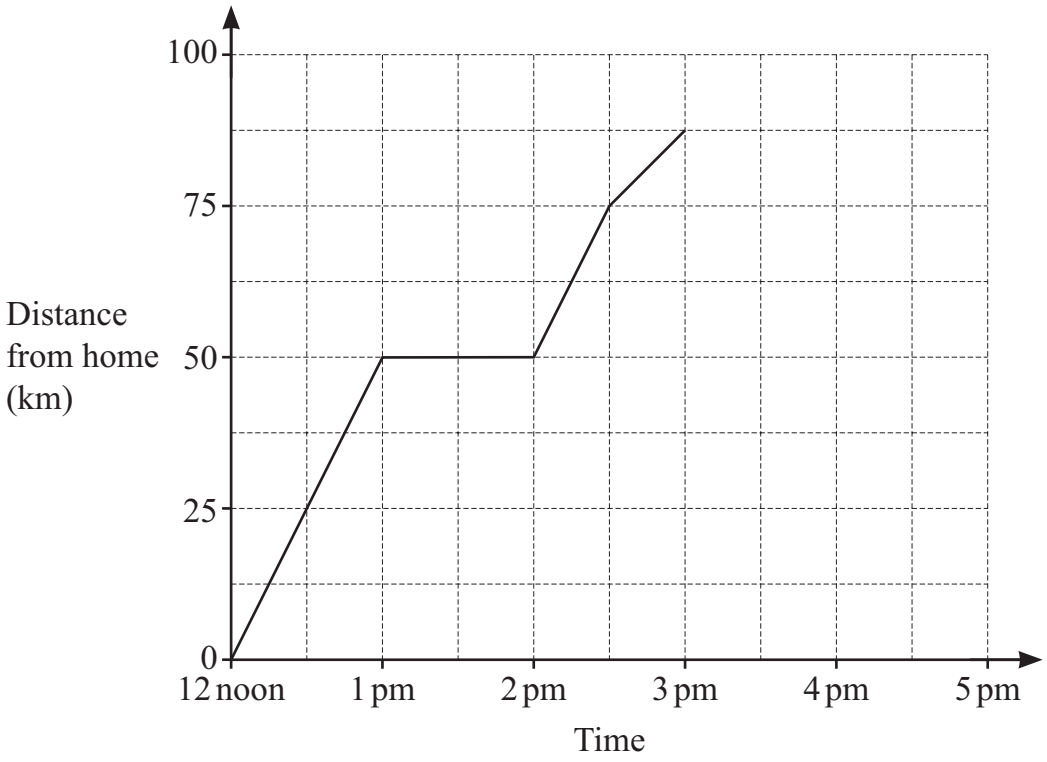
10 Work out.

$$\left(1-\frac{3}{5}\right) \div \left(1-\frac{5}{9}\right)$$

Give your answer as a fraction in its simplest form.

..... [2]

11 The distance–time graph represents Jamila's journey from home.



Stage 1. She travels at a constant speed of 50 km/h for 1 hour.
Stage 2. She stops for 1 hour.

(a) Describe **fully** the next two stages of Jamila's journey.

Stage 3 .....

.....

Stage 4 .....

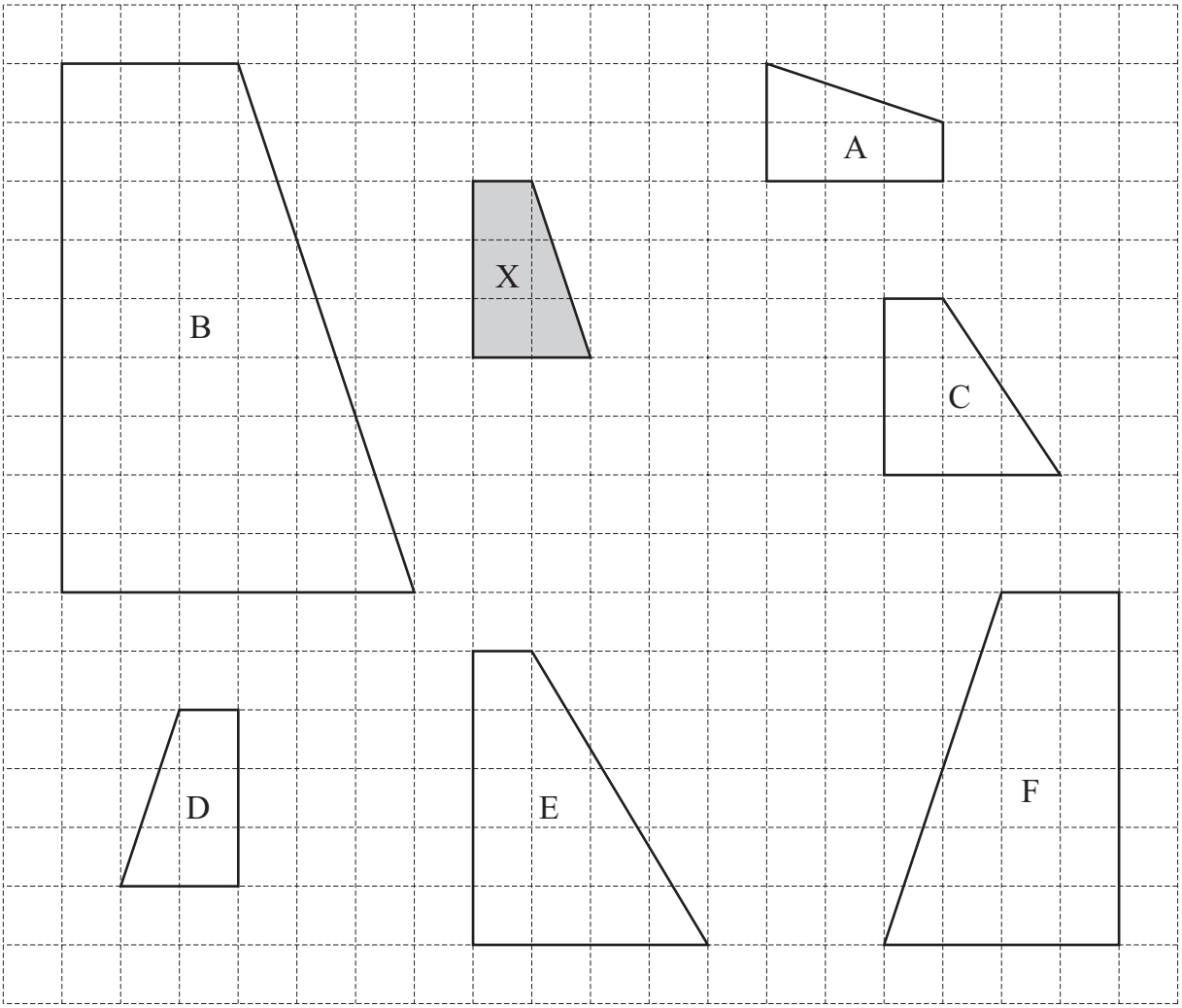
.....

[2]

(b) At 3 pm Jamila travels home at a constant speed of 50 km/h without stopping.

Complete the graph to show Jamila's journey home. [1]

12 Here are some shapes on a grid.



Write the letter A to F for each of the shapes in the correct part of the Carroll diagram.
Shape A has been done for you.

	Congruent to shape X	Not congruent to shape X
Similar to shape X	A	
Not similar to shape X		

[2]

13 Write a number in the box to make the statement correct.

$\sqrt{71} = \square$ .426…

[1]

14 **(a)** A scientist writes the number 760 000 000 in standard form.

Draw a ring around the correct answer.

7.6×10^7 $\quad$ 76×10^7 $\quad$ 7.6×10^8 $\quad$ 7.6×10^9

[1]

(b) The scientist measures the width of a human hair as 0.000 046 m.

Write this number in standard form.

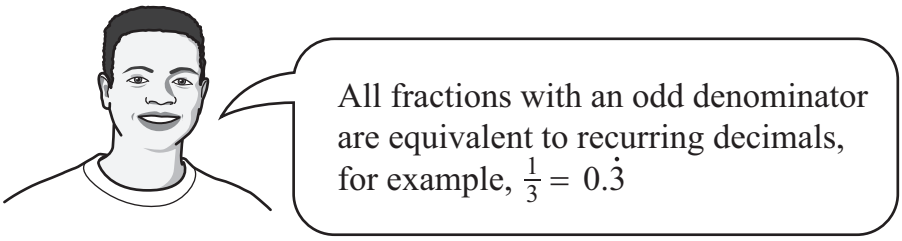
..... m [1]

15 Mike runs 4.5 laps of a field.
He runs a total distance of 3.78 km.

Find the distance of each lap.

..... km [1]

16 Carlos says,



Find an example to show that Carlos is **wrong**.

..... [1]

17 The function $y = (x - 3)^2$ can be represented by this function machine.

Input (x) → | –3 | → | Square | → Output (y)

(a) Find the output if the input is –1

..... [1]

(b) Find the **two** inputs that give an output of 9

.....

.....

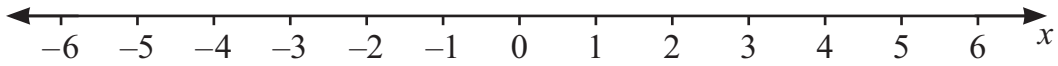
[2]

18 **(a)** Solve.

$2x - 9 < 6x + 3$

..... [2]

(b) Show your solution on the number line.



[1]

19 Work out.

$$4\frac{2}{5} - 2\frac{2}{3} + \frac{1}{3}$$

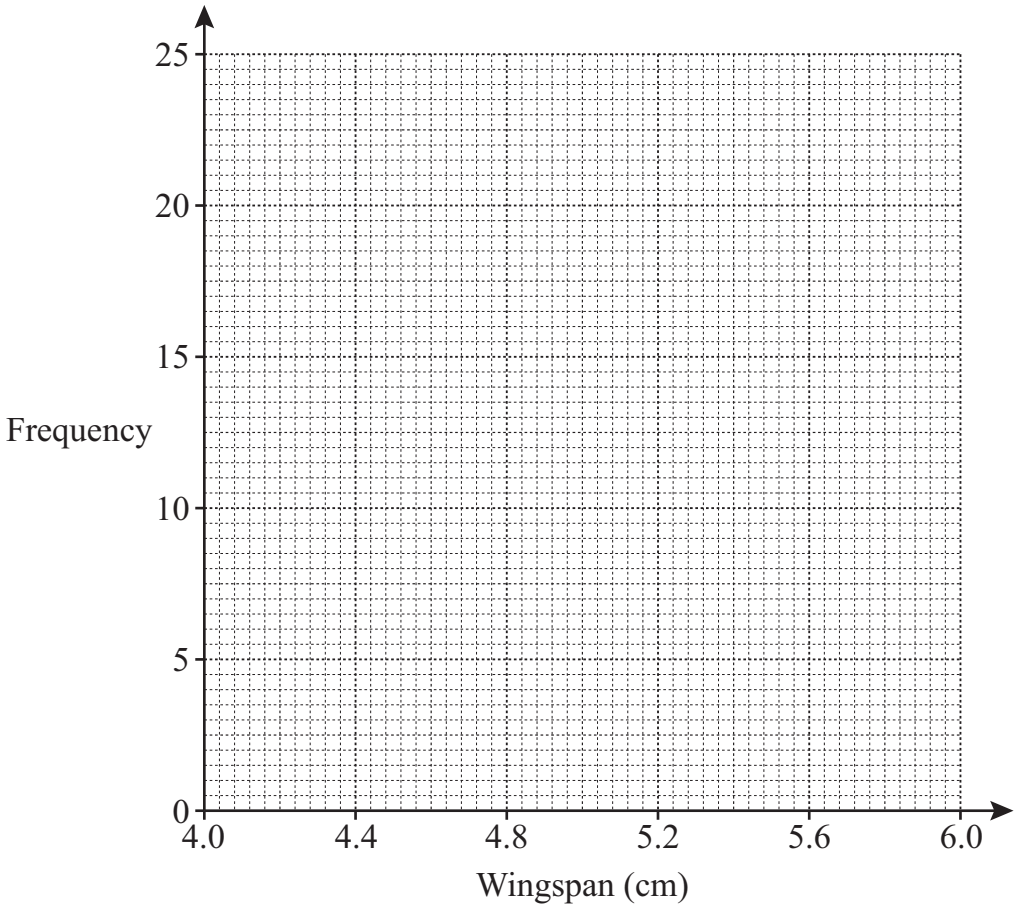
Give your answer as a mixed number in its simplest form.

..... [3]

20 The table shows information about the wingspans of 50 butterflies.

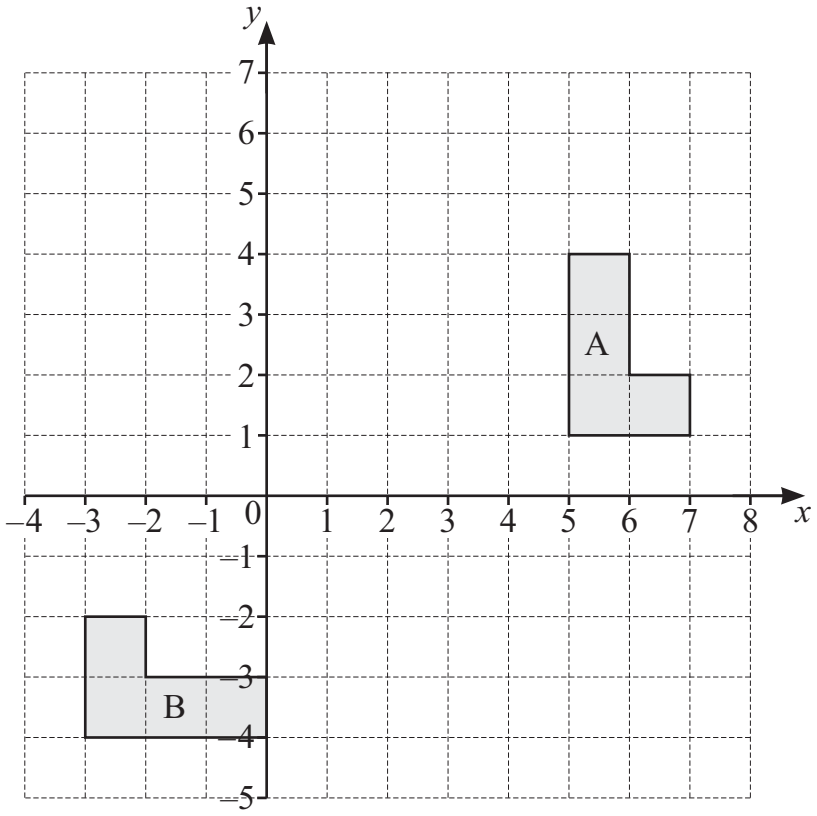
Wingspan (x cm)	Frequency
$4.0 \leq x < 4.4$	5
$4.4 \leq x < 4.8$	12
$4.8 \leq x < 5.2$	23
$5.2 \leq x < 5.6$	8
$5.6 \leq x < 6.0$	2

Draw a frequency polygon to show this information.



[3]

21 Shape A and shape B are drawn on the grid.



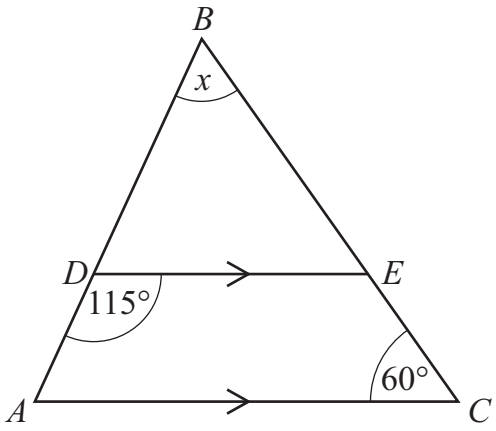
Shape A is mapped onto shape B by a combination of two transformations.
The first transformation is a reflection in the line $y = x$

Describe **fully** the second transformation.

.....

[2]

22 The diagram shows a triangle ABC.
DE is parallel to AC.



NOT TO SCALE

Calculate the size of the angle marked x.

..... ° [2]

23 The line segment joining (a, b) to (c, d) has a midpoint of $(3.5, -2)$.

Suggest possible coordinates for (a, b) and (c, d).

$(a, b) = ($ ..... , ... $)$

$(c, d) = ($ ..... , ... $)$

[2]

24 Simplify.

$$\frac{4p - 12pq}{4p}$$

.....[1]

25 The nth term of sequence S is $2n + 5$

The nth term of sequence T is $3n - 6$

(a) Show that 91 is a term in sequence S.

[1]

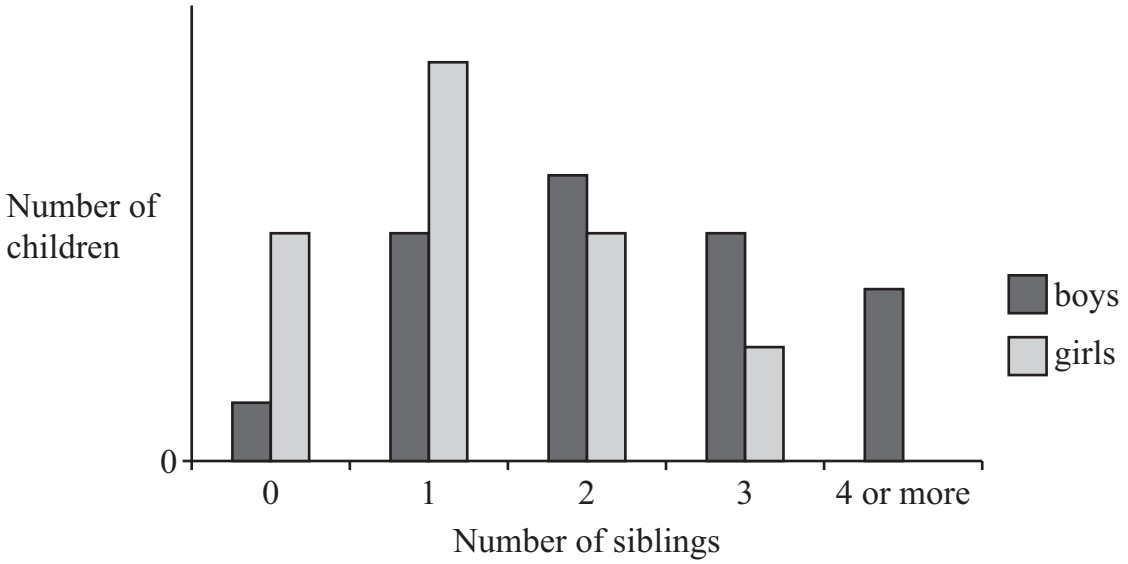
(b) Show that 91 is **not** a term in sequence T.

[1]

(c) Find the value of the term that is in both sequences **and** is in the same position in each sequence.

.....[2]

26 Mia asks the boys and girls in her class how many siblings (brothers and sisters) they each have.
She draws this chart of her results.



Tick (✓) to show if the boys or the girls generally have more siblings.

Boys ☐ Girls ☐

Explain how you know.

.....

.....

Tick (✓) to show if the range of the number of siblings is bigger for the boys or the girls.

Boys ☐ Girls ☐

Explain how you know.

.....

.....

[2]

27 Solve the simultaneous equations.

$$4x + 5y = 17$$
$$2x + 4y = 13$$

$x =$ .....

$y =$ .....

[3]