Cambridge Assessment International Education

Mathematics

Stage 9

Paper 2 **2023**

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 It takes 3 people 10 days to build a wall.

Find how many days it would take 6 people to build the same wall working at the same rate.

..... [1]

2 The term-to-term rule for a sequence is 'subtract k'.
The 1st term of the sequence is 40
The 4th term of the sequence is 35.5

(a) Find the 2nd and 3rd terms of the sequence.

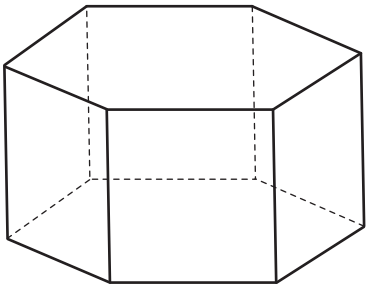
40, ... , ... , 35.5

[1]

(b) Find the first negative term in the sequence.

..... [1]

3 A prism has a cross-section that is a regular hexagon.



NOT TO SCALE

(a) Write down the number of planes of symmetry of this prism.

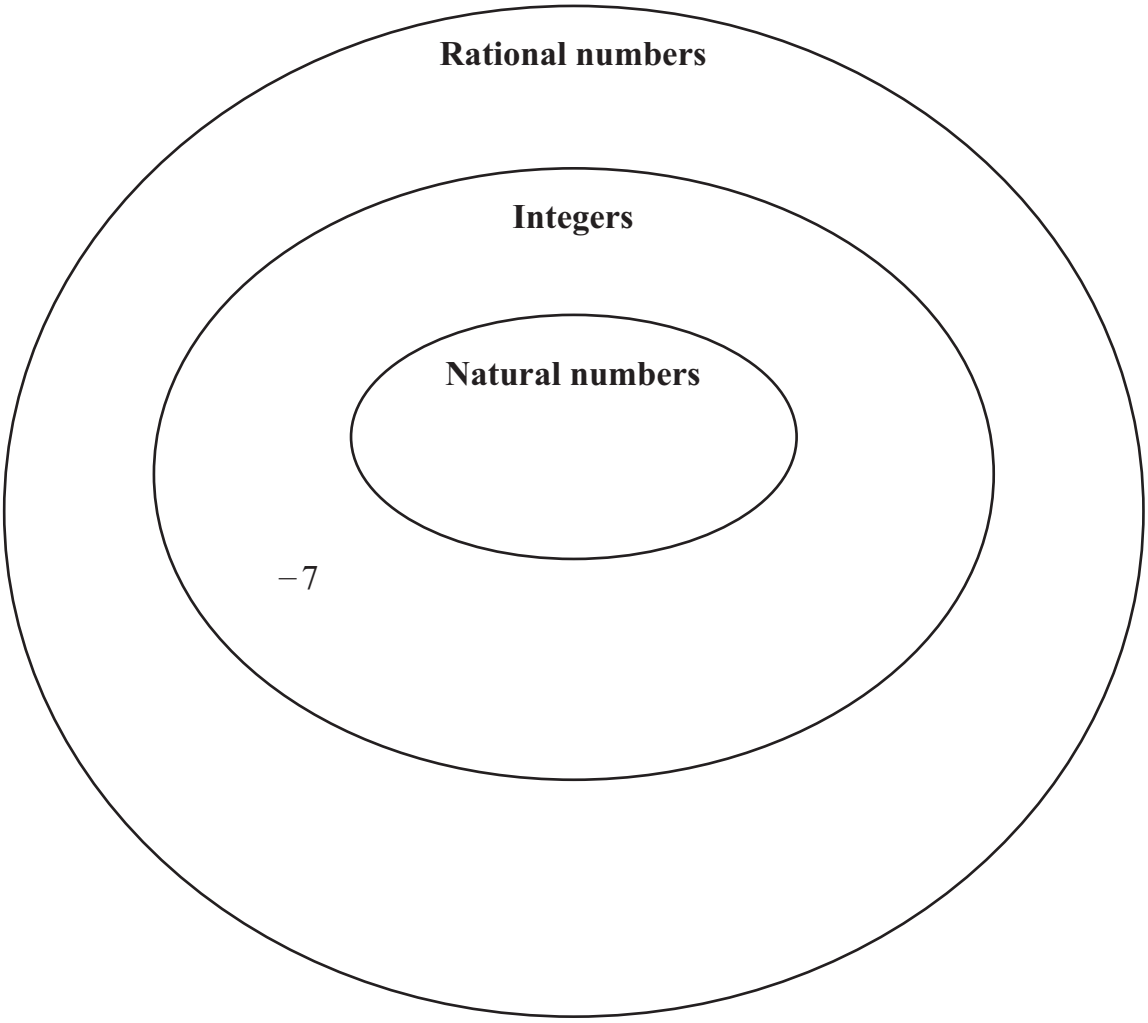
..... [1]

(b) The area of the cross-section of the prism is $10.4\,m^2$.
The volume of the prism is $8.84\,m^3$.

Calculate the height of the prism.

..... m [1]

4 **(a)** Here is a Venn diagram.



Write each of these numbers in the correct part of the Venn diagram.
One has been done for you.

-7 $\quad 12 \quad$ $\sqrt{36}$ $\quad 4.7 \quad$ $-\frac{55}{11}$ $\quad -\frac{2}{3}$

[2]

(b) Here is a list of words.

rational irrational prime odd square

Complete the sentence using the correct word from the list.

$\sqrt{3}$ and $\sqrt{5}$ are examples of ..... numbers.

[1]

5 Expand and simplify.

$$(x + 7)(x + 2)$$

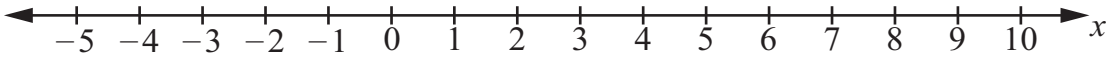
..... [2]

6 **(a)** Solve the inequality.

$$-2 \leq x - 3 < 5$$

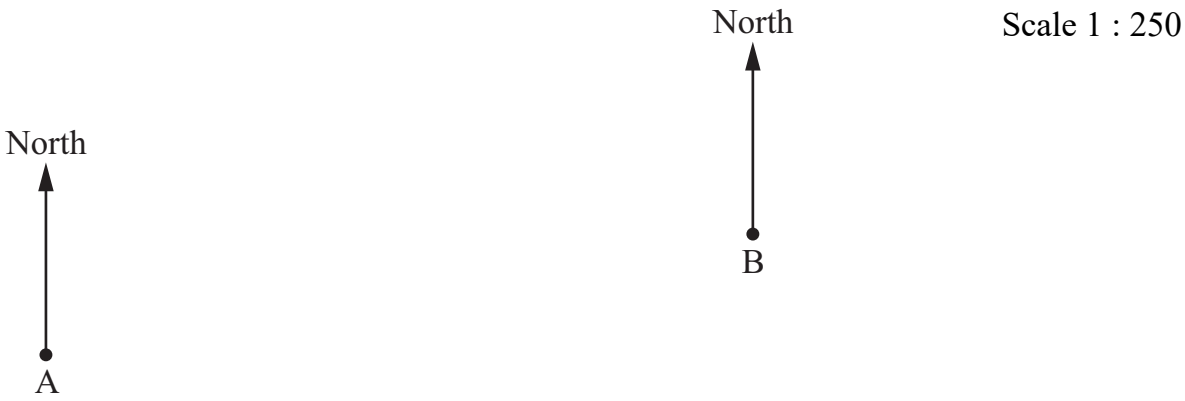
..... [1]

(b) Show your solution to part **(a)** on the number line.



[1]

7 The map shows the position of two trees, A and B.

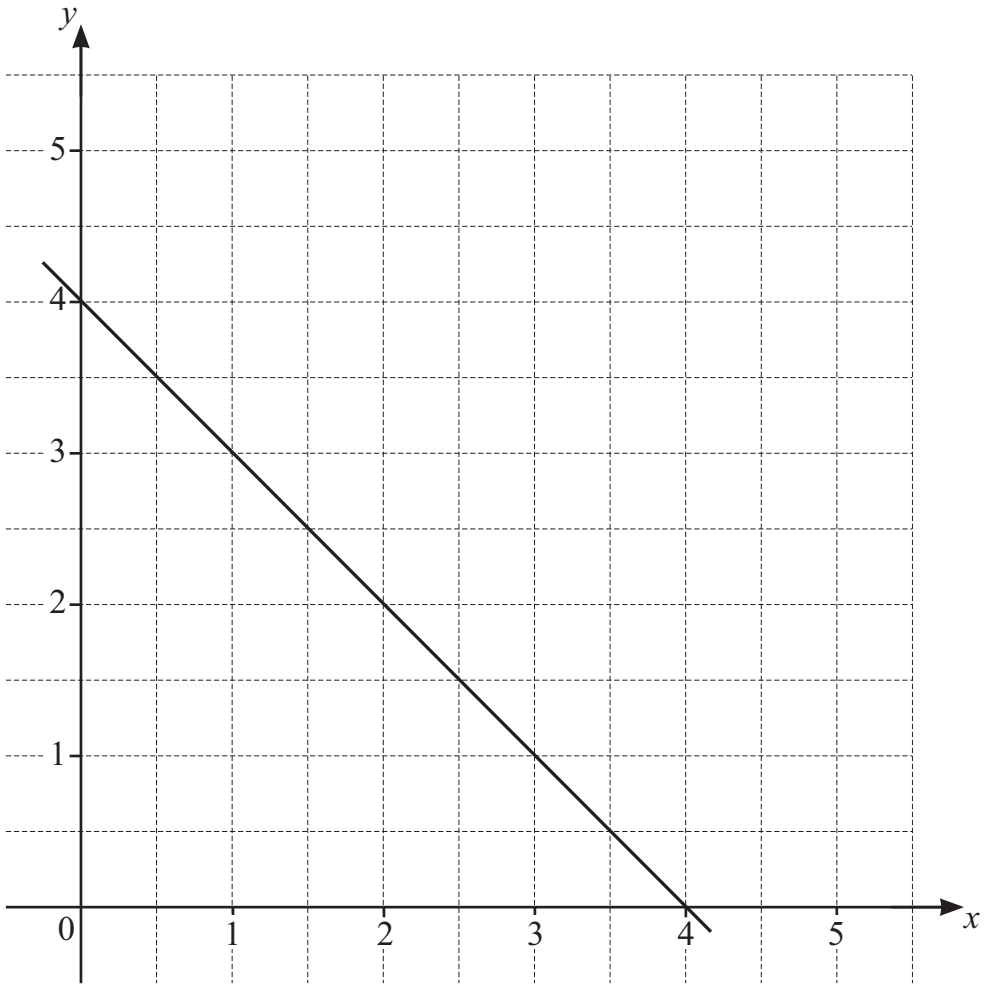


Tree C is on a bearing of 110° from tree A.
Tree C is on a bearing of 205° from tree B.
The scale of the map is 1 : 250

Find the actual distance, in metres, between tree B and tree C.
You should show the position of tree C on the map.

..... m [3]

8 The graph of $x + y = 4$ is drawn on the grid.



(a) Draw the graph of $y - x = 1$ on the same grid. [2]

(b) Use the graph to write down the solution to the pair of simultaneous equations

$x + y = 4$
and
$y - x = 1$

$x =$ .....

$y =$ .....
[1]

9 A teaspoon of sugar has a mass of 4.2 grams.

(a) Write down the mass of this sugar in milligrams.

..... mg [1]

(b) Mike says, 'There are 12 000 grains of sugar in one teaspoon.'

Use Mike's value to calculate the mass of one grain of sugar, **in grams**.
Give your answer in standard form.

..... g [2]

10 Two friends share some money in the ratio 3 : 5
One friend gets $1.50

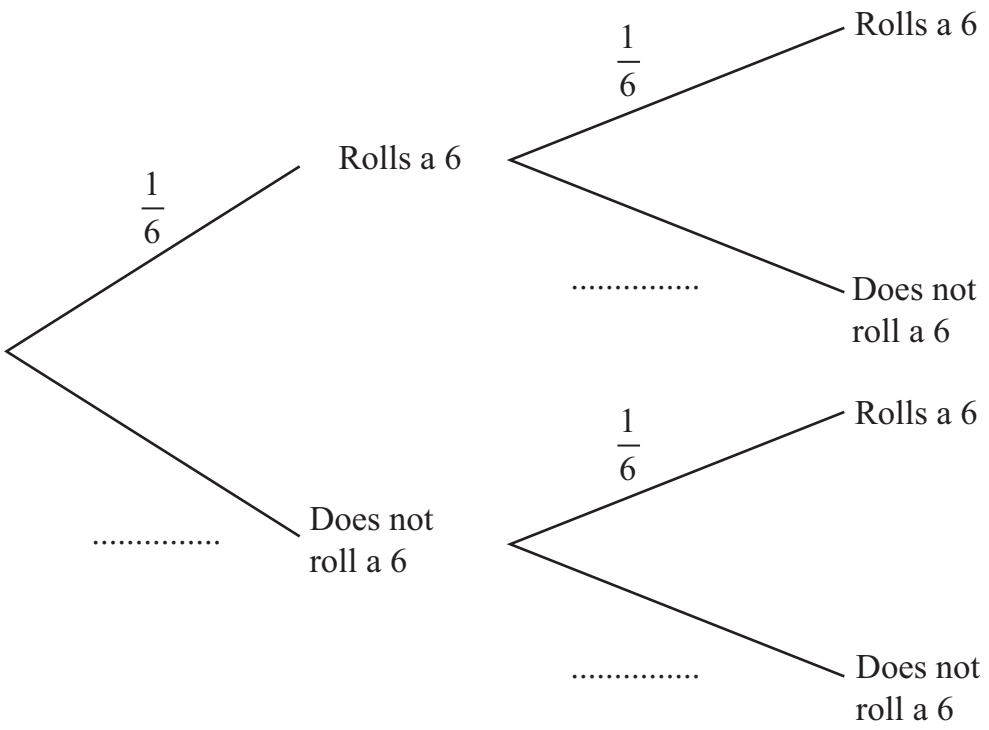
Find the **two** possible amounts that the other friend gets.

$ .....

or $ .....

[2]

11 Safia rolls a fair blue dice and a fair green dice.



(a) Complete the tree diagram. [1]

(b) Find the probability that she rolls exactly one 6

..... [2]

(c) Complete the sentence using a word or words from the list.

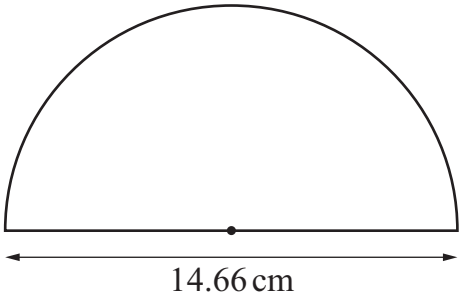
dependent independent mutually exclusive complementary

'Safia rolls a 6 on the blue dice' and 'Safia does not roll a 6 on the green dice' are

..... events.

[1]

12 Here is a semicircle.



Calculate the area of the semicircle.
Give your answer correct to **three** significant figures.

..... cm^2 [3]

13 An elk has a top speed of 72.4 kilometres per hour.
An ostrich has a top speed of 43.0 miles per hour.

Tick (✓) to show which of these animals has the fastest top speed.
You must show your working.

Elk ☐ Ostrich ☐

[2]

14 Samira wants to compare the heights of boys and girls when they are 14 years old.

(a) She takes a random sample of five boys from the local running club and five girls from her class at school.
The children that she samples are all 14 years old.

Give two reasons why this may **not** be a good sample.

1 .....

.....

2 .....

.....

[2]

(b) Samira measures the height, h cm, of each child.
Samira wants to record the heights using these class intervals.

$h < 150$ $150 < h < 160$ $160 < h < 170$ $h > 170$

Explain why she may **not** be able to record every child's height in these class intervals.

.....

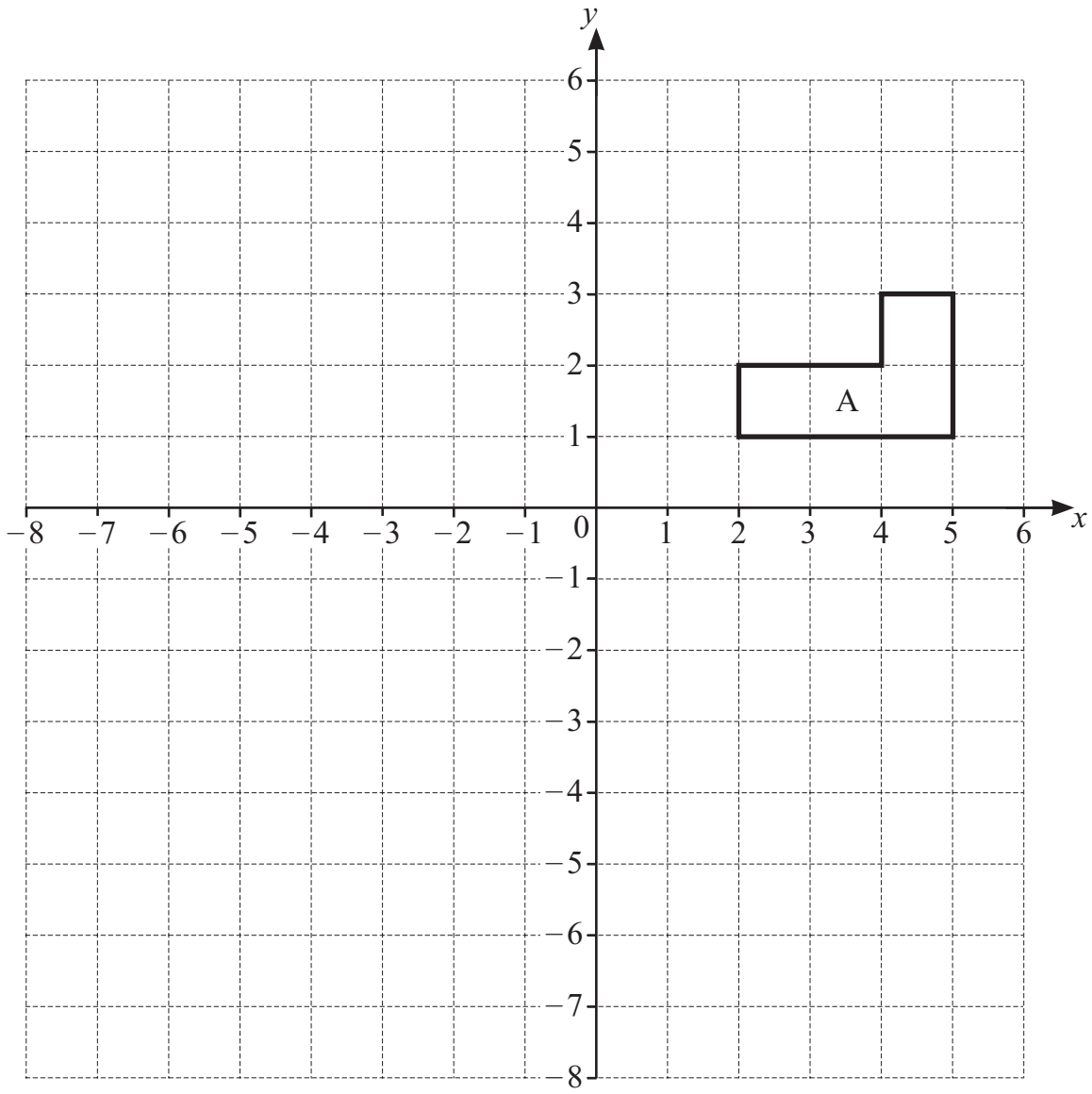
..... [1]

(c) Write down the correct class intervals that allow Samira to record every child's height.
One has been done for you.

$h < 150$ ....

[1]

15 Shape A is shown on a grid.



(a) Reflect shape A in the line $x = 3$ and label the image B.
Then reflect shape B in the line $y = -2$ and label the image C. [2]

(b) Describe fully the **single** transformation that maps shape A onto shape C.

.....

..... [2]

16 A formula used in physics is $v^2 = u^2 + 2as$

(a) Find the **two** possible values of v when $u = 2.1$ $a = -9.8$ $s = -5.4$

$v =$ .....

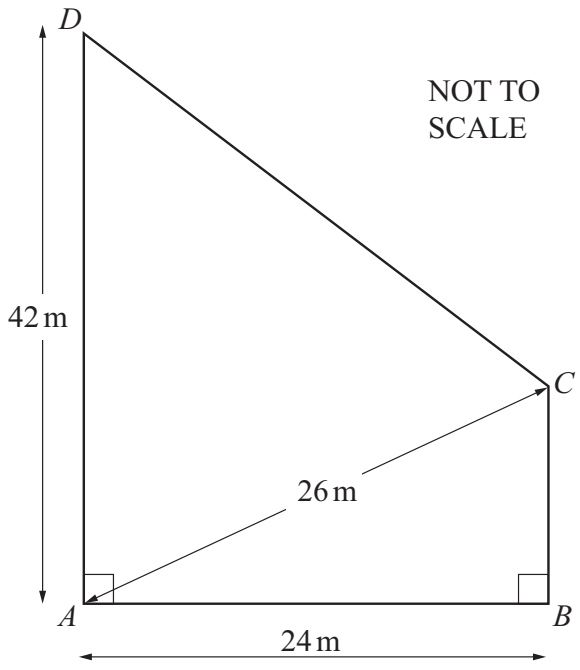
or $v =$ .....

[2]

(b) Rearrange this formula to make a the subject.

$a =$ ..... [2]

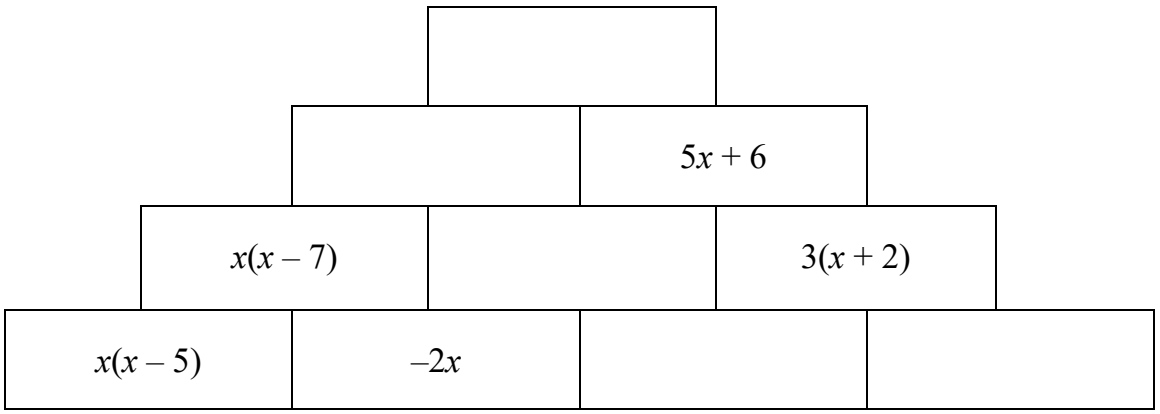
17 A field is in the shape of a trapezium $ABCD$.



Calculate the perimeter of the field.

..... m [3]

18 In this pyramid each expression is equal to the sum of the two expressions immediately **below** it.



Complete the pyramid, writing each expression in its simplest form.

[3]