**Cambridge Secondary 1 Progression Test**

Question paper

Cambridge Secondary 1

**55 minutes**

# Mathematics Paper 2

## Stage 9

*4295752272*

Name .....

Additional materials: Ruler
Calculator
Tracing paper
Geometrical instruments

**READ THESE INSTRUCTIONS FIRST**

Answer **all** questions in the spaces provided on the question paper.

You should show all your working on the question paper.

The number of marks is given in brackets [ ] at the end of each question or part question.

The total number of marks for this paper is 45.

| For Teacher's Use | |
|---|---|
| **Page** | **Mark** |
| **1** | |
| **2** | |
| **3** | |
| **4** | |
| **5** | |
| **6** | |
| **7** | |
| **8** | |
| **9** | |
| **10** | |
| **11** | |
| **12** | |
| **13** | |
| **14** | |
| **15** | |
| **16** | |
| **Total** | |

DC (NH/SW) 93956/8RP


CAMBRIDGE International Examinations

For Teacher's Use

**1** A microwave oven normally costs \$160

In a sale there is a discount of 15%.

Work out the sale price of the microwave oven.

\$ ..... [1]

**2** Jamil is conducting a survey to find out how much time students in his school spend doing homework.
He is going to ask the first 10 students on the register in his maths class.

This may **not** produce a good sample for Jamil's survey.
Give two reasons why.

Reason 1 .....

.....

Reason 2 .....

..... [2]

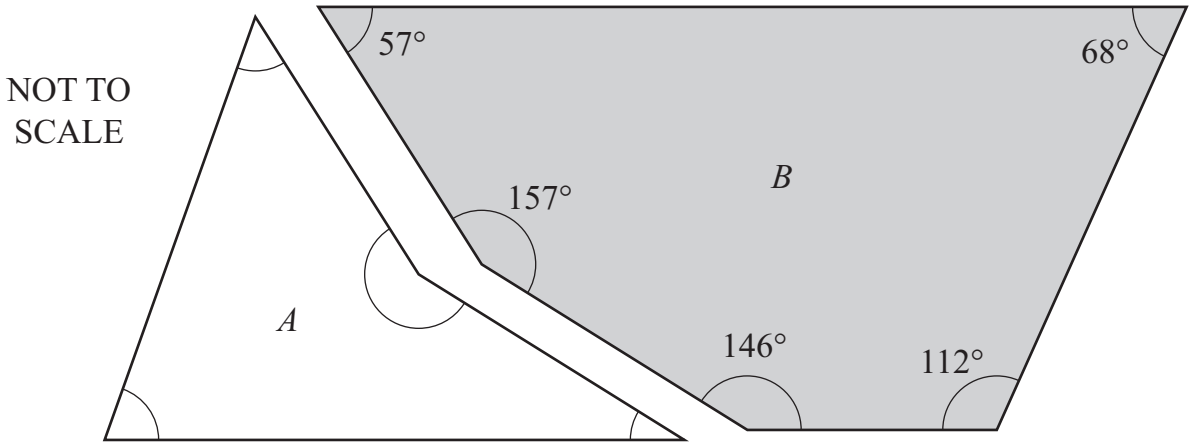
**3** Work out $\frac{38 - 7}{2 + 5}$

Give your answer to **2 decimal places**.

..... [2]

For Teacher's Use

**4** Two shapes *A* and *B* fit together to make a parallelogram.




Work out the sizes of the **four** angles in shape *A*.
Write them in the correct places on the diagram.

[2]

**5** One solution to $x^2 + 3x = 17$ is between 2 and 3

Use trial and improvement to find this solution.
Give your answer to **1 decimal place**.
You must record your trials in the table.

| $x$ | $x^2 + 3x$ | Bigger or smaller than 17 |
|---|---|---|
| 2 | $2^2 + 3 \times 2 = 10$ | smaller |
| 3 | $3^2 + 3 \times 3 = 18$ | bigger |

$x$ = ..... [2]



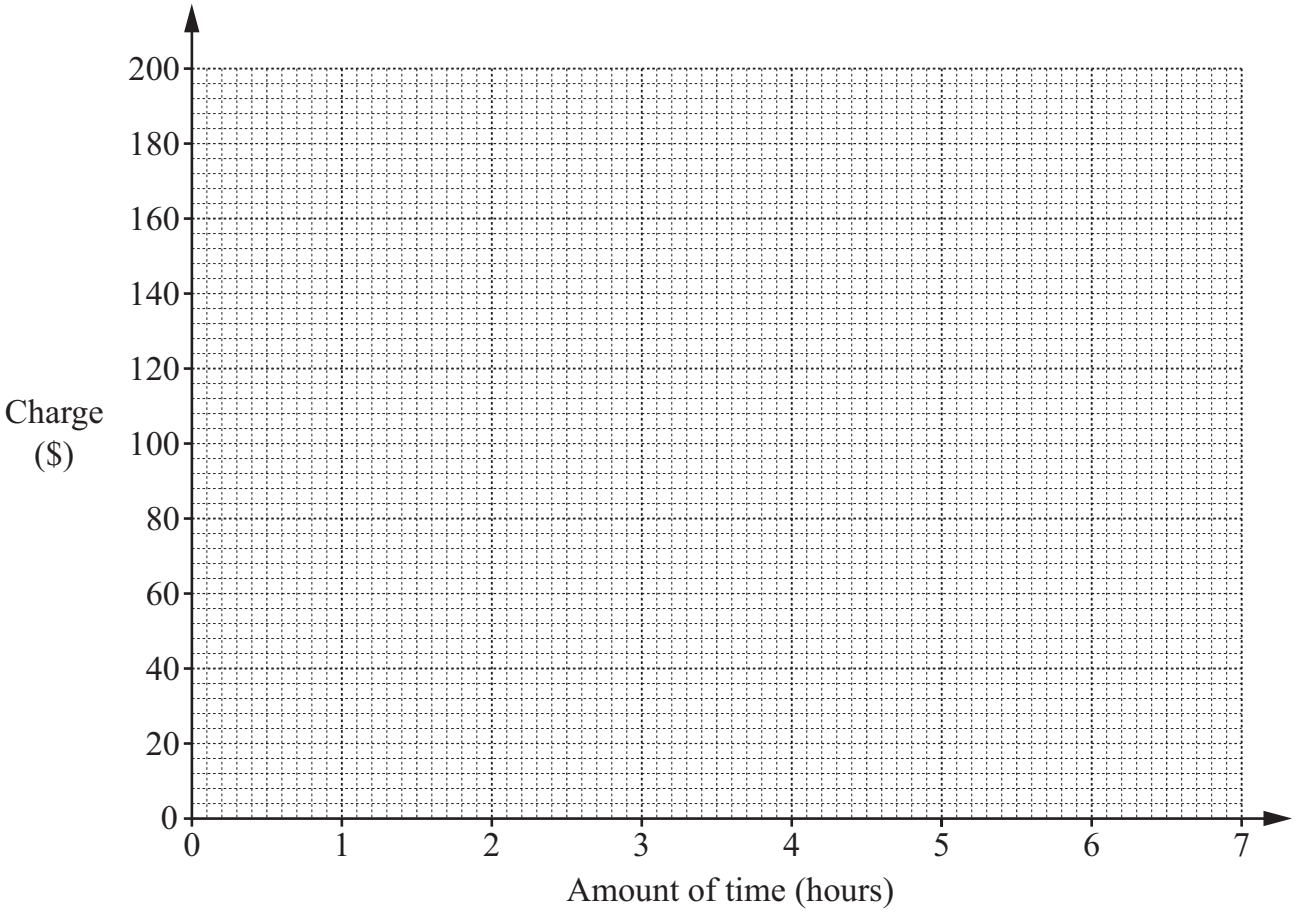
[Turn over

**6** Ludwik is an engineer.
He charges a fixed call out fee plus an hourly rate for each job.

The table shows how much Ludwik charges for three jobs that last different amounts of time.

| **Amount of time (hours)** | 1 | 4 | 6 |
|---|---|---|---|
| **Charge ($)** | 50 | 140 | 200 |

**(a)** Draw the **straight line graph** that shows this information.




[1]

**(b)** Write down Ludwik's fixed call out fee.
This is the cost before he has worked any hours.

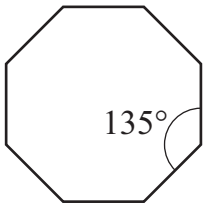
$ ..... [1]

**(c)** Work out Ludwik's hourly rate.

$ ..... [1]

**7** Surinder thinks that regular octagons will tessellate.

For Teacher's Use




Is Surinder correct?

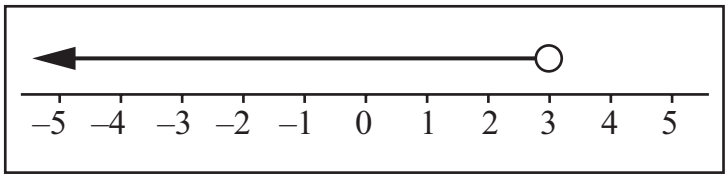
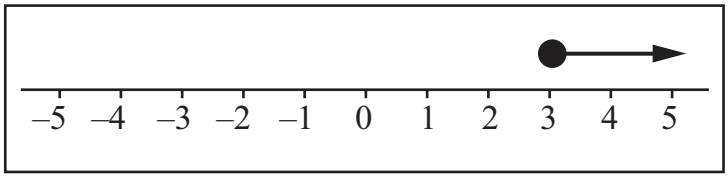
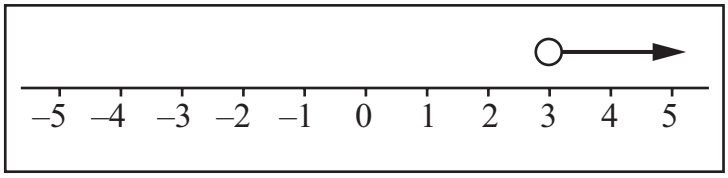
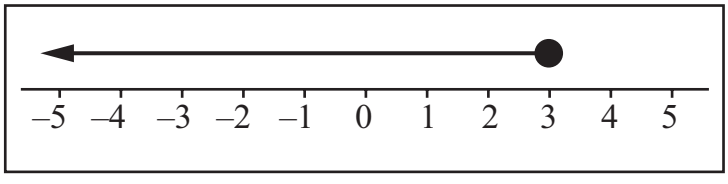
Tick (✓) a box. Yes ☐ No ☐

Explain your answer.

.....

..... [1]

**8** Draw lines to join each inequality to the correct solution set.

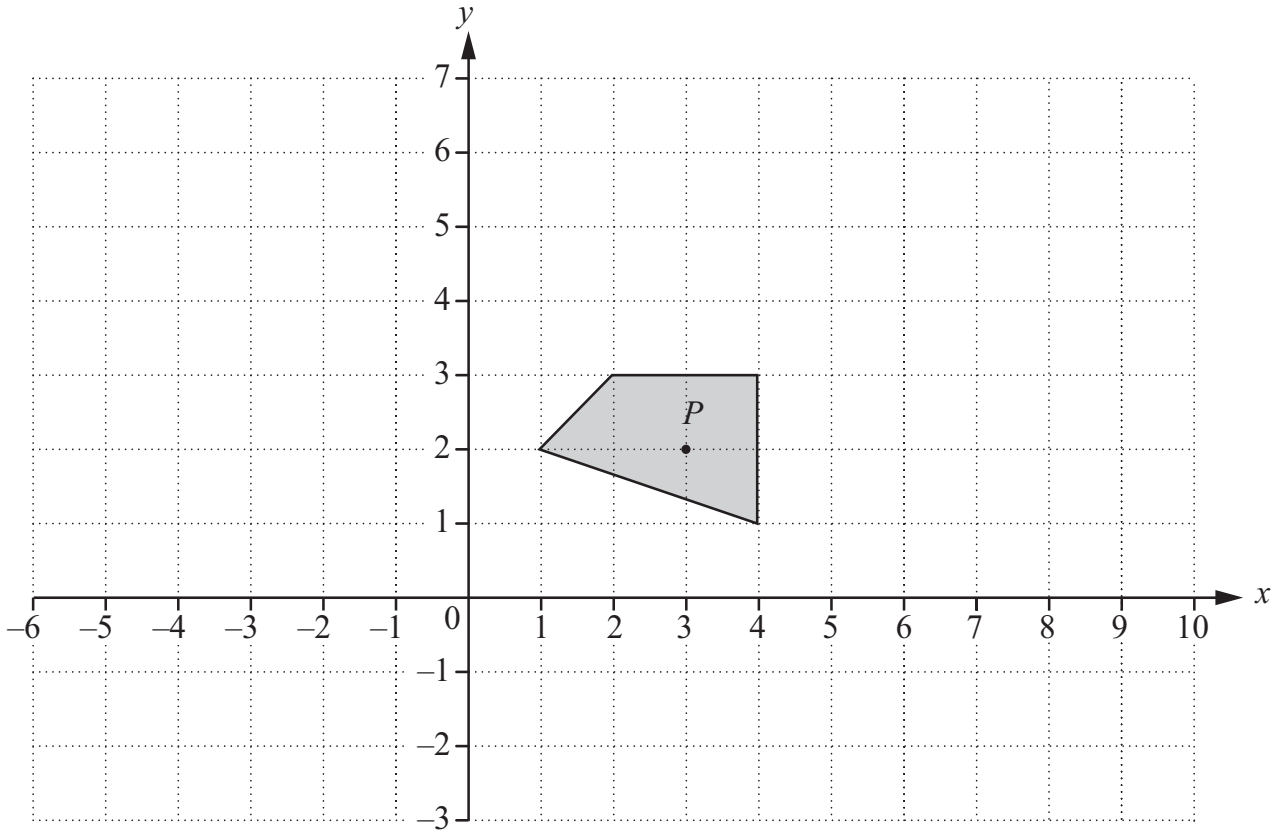
| **Inquality** | **Solution set** |
|---|---|
| $x > 3$ |  |
| |  |
| $x \leqslant 3$ |  |
| |  |



[1]

For Teacher's Use

**9** Here is quadrilateral $P$.




Draw an enlargement of quadrilateral $P$ with scale factor 3 and centre of enlargement (3, 2). [2]

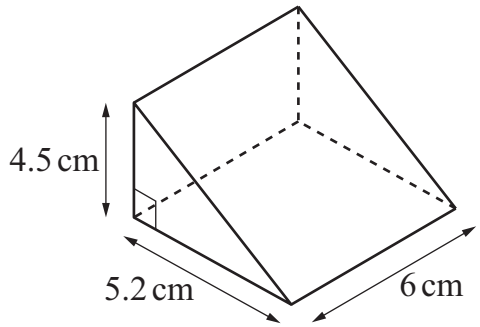
**10** Write as a single fraction.

$$\frac{2}{x} + \frac{3}{x}$$

..... [1]

**11** Here is a right angled triangular prism.






NOT TO SCALE

Put a ring around the correct working for the volume of this prism.

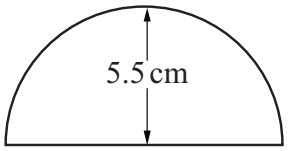
$\frac{1}{2}(4.5 + 5.2) \times 6$ $\quad 4.5 \times 5.2 \times 6$ $\quad 4.5 \times 5.2 \times 6 \div 2$ $\quad \frac{1}{3} \times 4.5 \times 5.2 \times 6$

[1]

**12** Work out the value of $5x^2$ when $x = -3.4$

..... [1]

**13** Here is a semi-circle with radius 5.5 cm.




NOT TO SCALE

Work out the perimeter of this semi-circle.

..... cm [2]

**14** The table shows some functions and their inverses.

For Teacher's Use

Complete the table.
The first row has been done for you.

| Mapping | Function | Reverse mapping | Inverse function |
|---|---|---|---|
| → [× 4] → | $m \rightarrow 4m$ | ← [÷ 4] ← | $m \rightarrow \frac{m}{4}$ |
| → [× 2] → [– 3] → | $m \rightarrow 2m - 3$ | ← [.....] ← [.....] ← | $m \rightarrow$ ..... |

[2]

**15** Tick (✓) whether each set of data is primary or secondary.

| | Primary | Secondary |
|---|---|---|
| Adam collects data about heights by measuring students in his class. | ☐ | ☐ |
| Bob collects data about cricket scores using the internet on his computer. | ☐ | ☐ |
| Carol collects data about masses of animals from a book. | ☐ | ☐ |

[1]

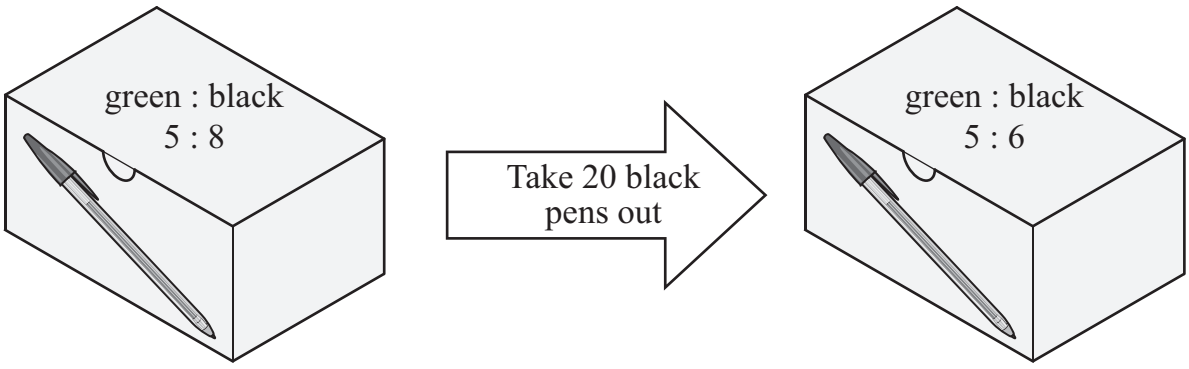
**16** The table shows the population of Thailand for 1968 and 2013.

| Year | Population |
|---|---|
| 1968 | 34.50 million |
| 2013 | 66.93 million |

What is the percentage increase in the population of Thailand from 1968 to 2013?

.....% [2]

**17** In a box the ratio of green to black pens is 5 : 8
Imre takes 20 black pens out of the box.
Now the ratio of green to black pens is 5 : 6




Work out the number of **green** pens in the box.

..... [2]

For Teacher's Use

**18** Make $x$ the subject of this formula.

$$y = 5(t + x)$$

$x =$ ..... [2]

**19** Put these numbers in order, from smallest to largest.

$$1 \qquad 0.3 \qquad \frac{1}{3} \qquad 5\% \qquad \frac{9}{20}$$

..... ..... ..... ..... .....
smallest largest

[2]

**20** Lucas, Gabriela and Ingrid are solving the equation $4(n + 3) = 8n - 8$
They each start the solution in different ways.

Tick (✓) whether their statements are true or false.
The first one is done for you.

| | | True | False |
|---|---|---|---|
| *Lucas* | $4(n + 3) = 8n - 8$<br>so $4n + 4 = 8n$ | ☐ | ☑ |
| *Gabriela* | $4(n + 3) = 8n - 8$<br>so $n + 3 = 2n - 2$ | ☐ | ☐ |
| *Ingrid* | $4(n + 3) = 8n - 8$<br>so $12 = 4n - 8$ | ☐ | ☐ |

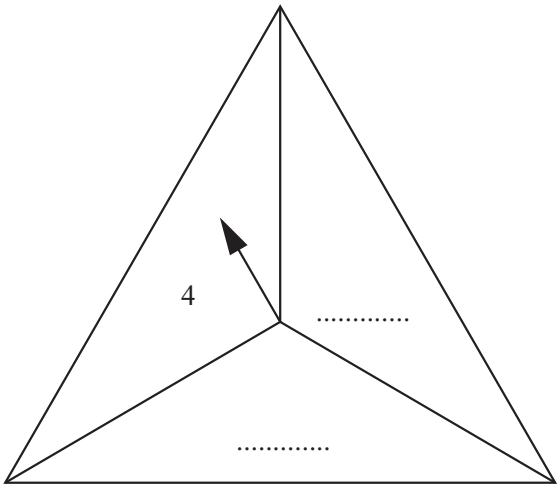
[1]

**21** Mr Green spins two fair spinners.
Some of the possible outcomes are recorded in this table.

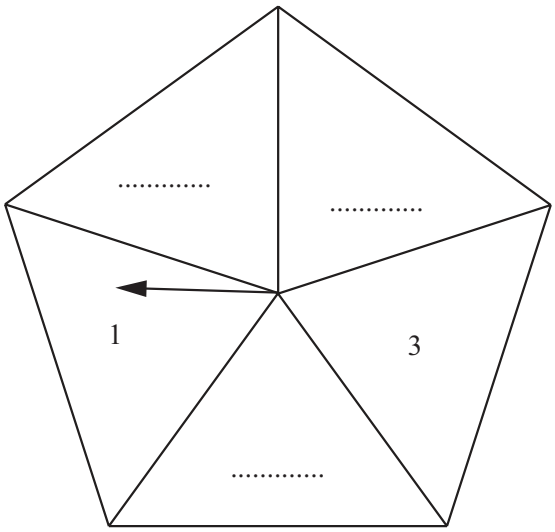
For Teacher's Use

| | | Spinner 2 | | | | |
|---|---|---|---|---|---|---|
| | | **1** | | **3** | | |
| **Spinner 1** | | | 7, 5 | | | 7, 9 |
| | **4** | 4, 1 | 4, 5 | | | |
| | | | | 2, 3 | 2, 2 | |

Complete the diagrams of the spinners by filling in the missing values.




**Spinner 1**




**Spinner 2**

[2]

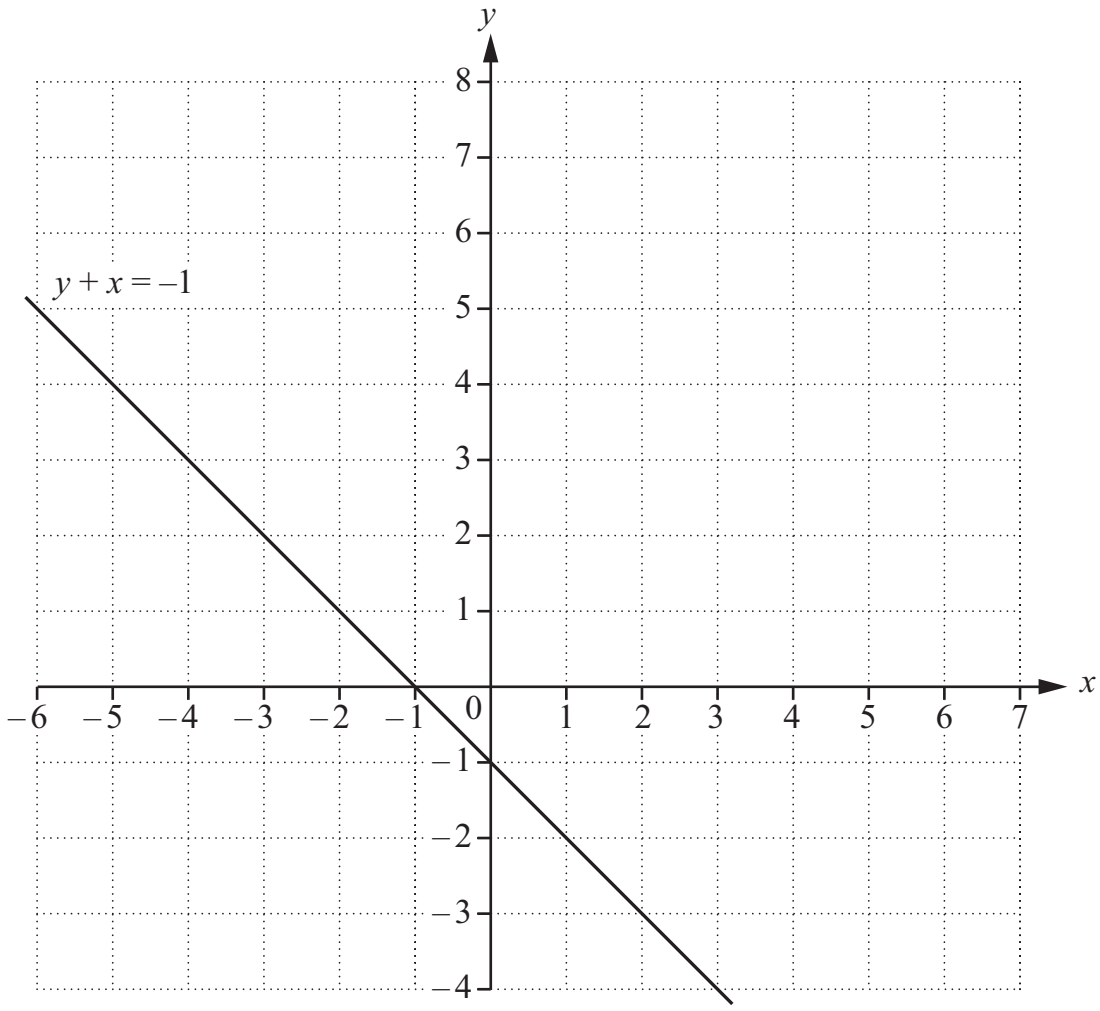
**22** **(a)** Complete this table of values for the equation $2y - x = 4$

| $x$ | | 0 | 2 | 6 |
|---|---|---|---|---|
| $y$ | 0 | | 3 | |

[2]

**(b)** Here is a graph of the line $y + x = -1$

Draw the graph of $2y - x = 4$ on the same axes.




[1]

**(c)** Use your graph to write down the solution to the simultaneous equations.

$$y + x = -1$$

$$2y - x = 4$$

$x =$ .....

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

**23** In a trial, two different light bulbs are being compared.
The trial looks at how long the light bulbs last.

**(a)** The relative frequency of a low energy bulb lasting 1001–1500 hours is 0.4

Complete the table.

| **Type of bulb** | **Number of bulbs tested** | **Hours bulbs lasted** | | |
|---|---|---|---|---|
| | | **0–1000 hours** | **1001–1500 hours** | **more than 1500 hours** |
| **Standard bulb** | 50 | 30 | 20 | 0 |
| **Low energy bulb** | 80 | 36 | | |

[1]

**(b)** Tick (✓) whether these statements are true or false.

| | True | False |
|---|---|---|
| The probability of a standard bulb lasting 0 – 1000 hours is the same as it lasting 1001–1500 hours. | ☐ | ☐ |
| The probability of a low energy bulb lasting 0 – 1000 hours is higher than for a standard bulb. | ☐ | ☐ |

[1]

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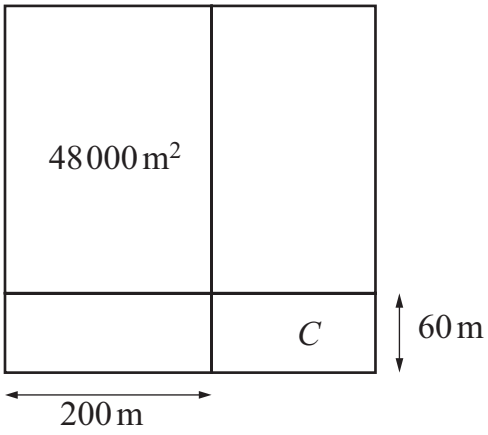
**24** The diagram shows a **square**.
The square is divided into four rectangles by two straight lines.
The area of the largest rectangle is $48\,000\,m^2$.




NOT TO SCALE

**(a)** Work out the area of the smallest rectangle, $C$.

.....$m^2$ [2]

**(b)** Complete this sentence.

The area $48\,000\,m^2$ is equivalent to ..... hectares. [1]

**25** A plant grows to a height of 8 cm in 1 week.

For Teacher's Use

Fatima says,

"Plant height and number of weeks are directly proportional.
The height of this plant in 2 years will be about 832 cm, because there are 104 weeks in 2 years."

Is Fatima likely to be correct?

Tick (✓) a box.

Yes ☐ No ☐

Explain your answer.

.....

..... [1]

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