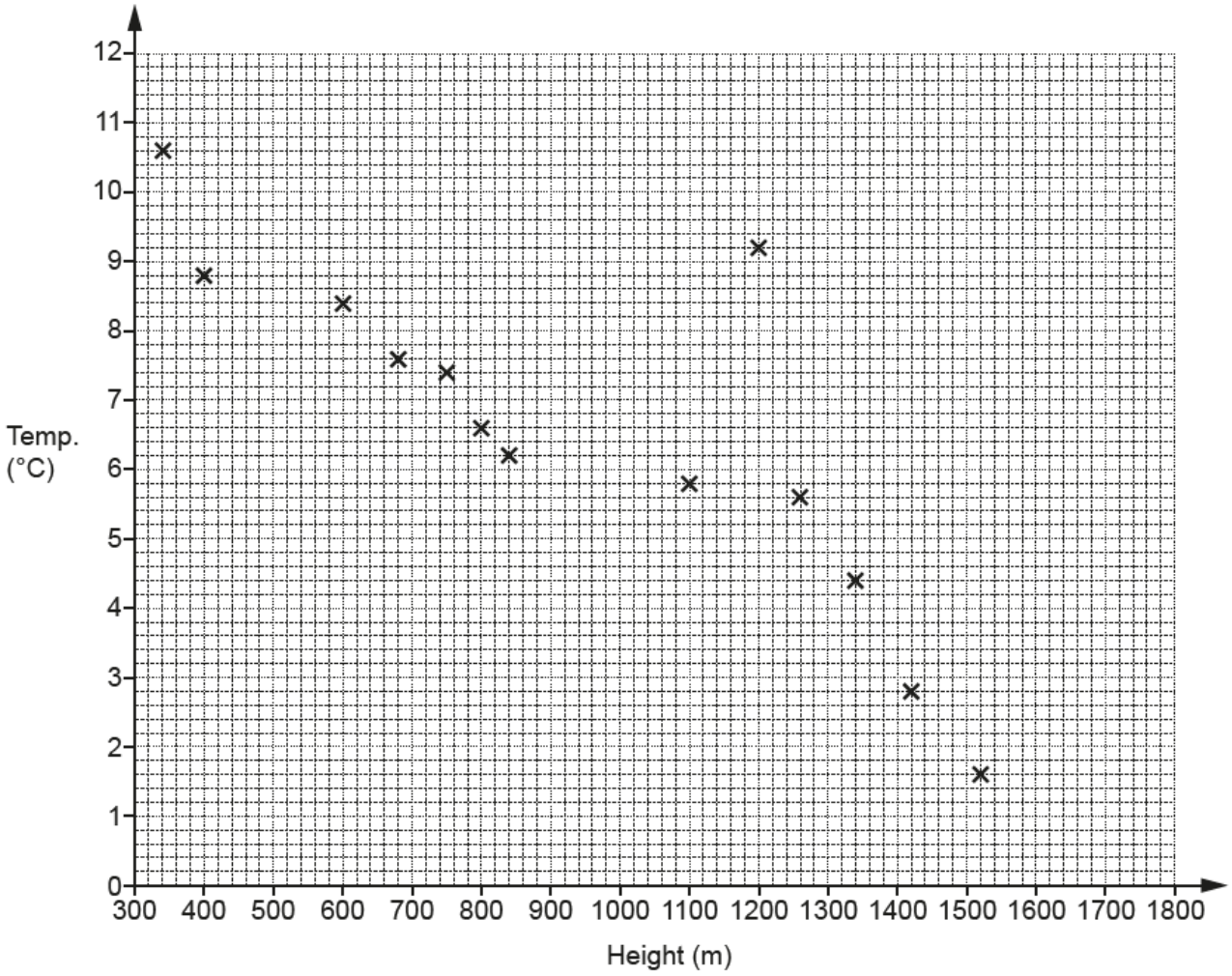
Graphs of equations and functions – 2022 GCSE Mathematics Higher

1. June/2022/Paper_J560/04/No.5

The scatter diagram shows the midday temperature at 13 different heights on a mountain.



(a) The table has the information for 2 more heights.

Plot these on the scatter diagram.

Height (m)	500	1580
Temperature (°C)	8.8	1.2

[2]

(b) Describe the type of correlation shown in the scatter diagram.

(b) ..... **[1]**

(c) By drawing a line of best fit, estimate the temperature at 1000 m.

(c) ..... °C **[2]**

(d) Circle the outlier on the scatter diagram. **[1]**

(e) Explain why using the scatter diagram to estimate the temperature at 1800 m may be unreliable.

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..... **[1]**

(f) Find the percentage of the 15 temperatures which are below 6 °C.

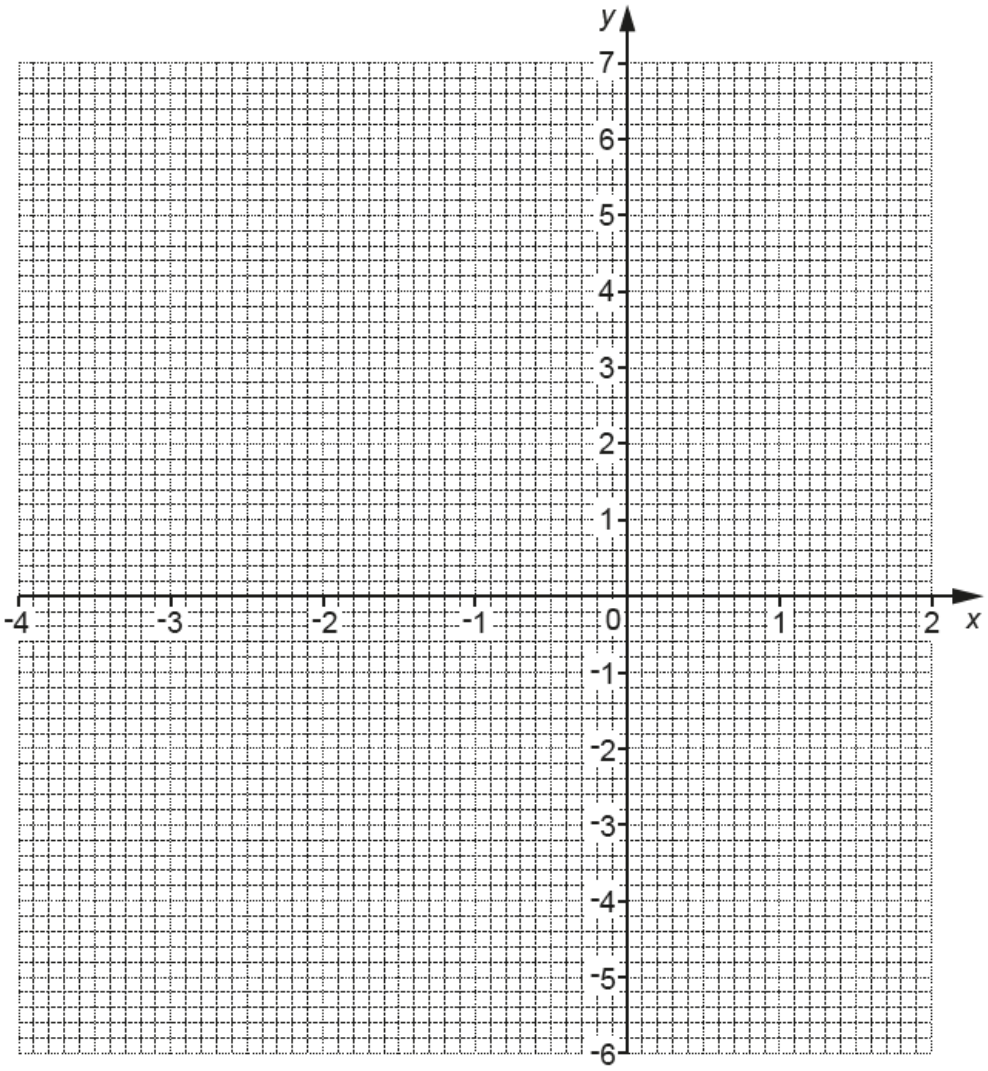
(f) ..... % **[3]**

2. June/2022/Paper_J560/04/No.8

Here is a table of values for $y = x^2 + 2x - 2$.

x	-4	-3	-2	-1	0	1	2
y	6	1	-2	-3	-2	1	6

(a) Draw the graph of $y = x^2 + 2x - 2$ for $-4 \leqslant x \leqslant 2$.



[3]

(b) Write down the equation of the line of symmetry of the graph.

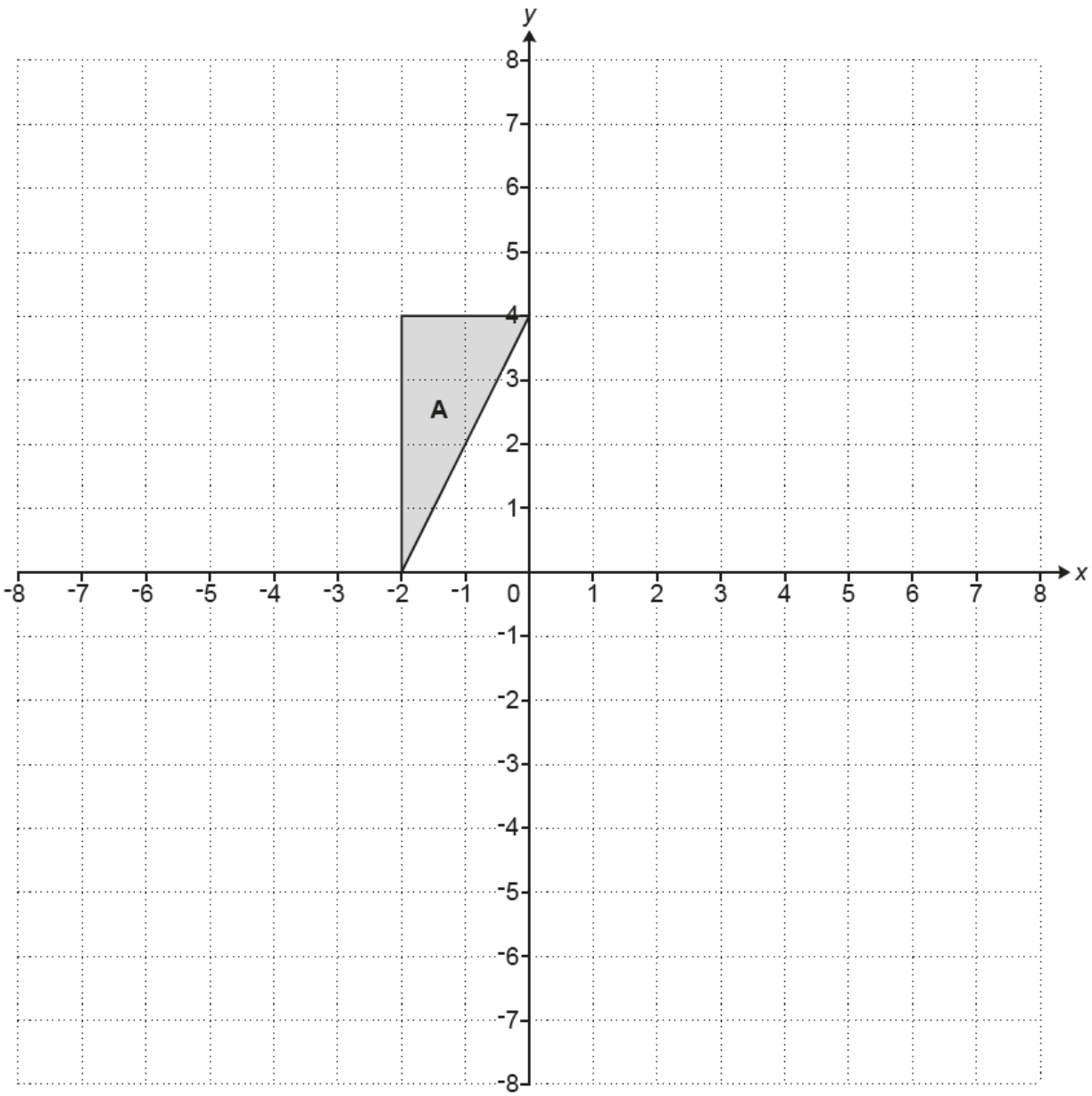
(b) ..... **[1]**

(c) Use the graph to solve the equation $x^2 + 2x - 2 = 0$.
Give your answers to **1** decimal place.

(c) $x =$ ..... or $x =$ ..... **[2]**

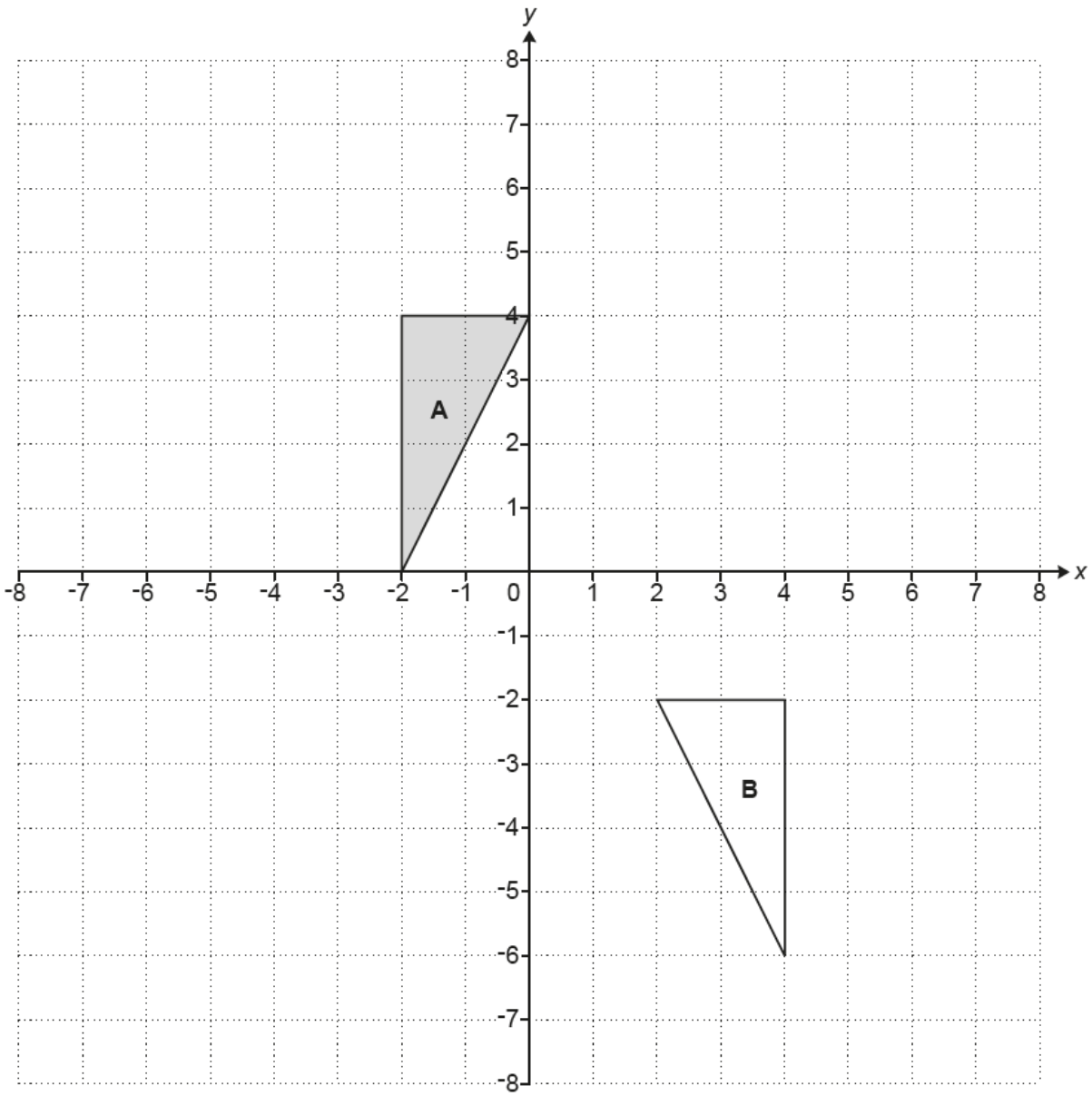
3. June/2022/Paper_J560/05/No.10

(a) Enlarge triangle **A** with scale factor 1.5 and centre of enlargement (-8, 0).



[3]

(b) Triangle **A** and triangle **B** are shown on the coordinate grid below.



Triangle **A** is mapped onto triangle **B** using a combination of two transformations:

- a transformation T, followed by
- a reflection in the *x*-axis.

Describe fully transformation T.

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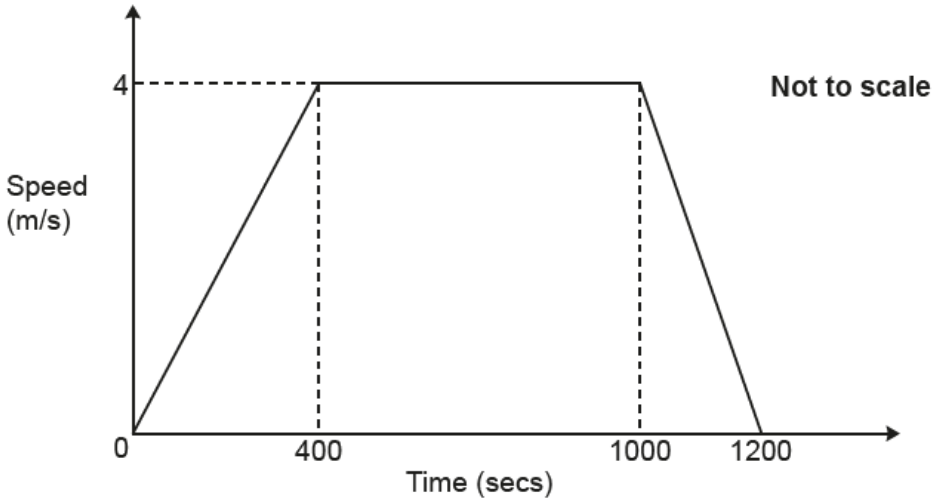
..... **[4]**

4. June/2022/Paper_J560/05/No.12

An athlete goes for a training run.
The graph shows their speed as they run.



(a) Write down the athlete's acceleration between 400 seconds and 1000 seconds.

(a) ..... m/s^2 **[1]**

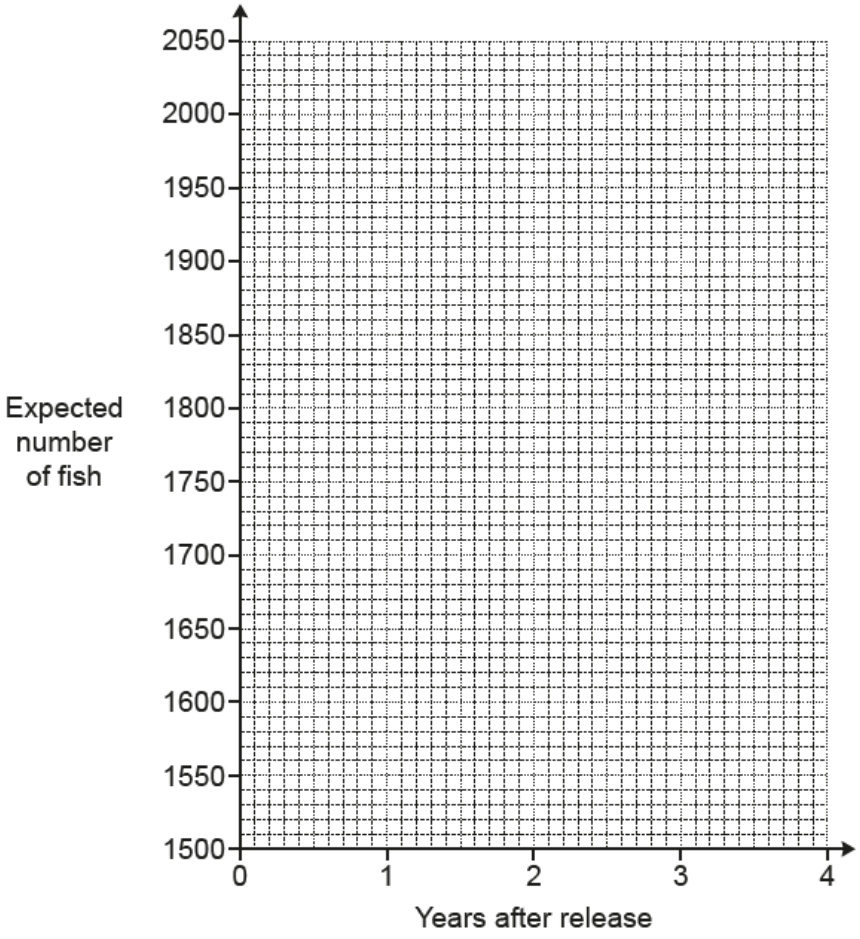
(b) Work out the athlete's average speed, in m/s, during the 1200 seconds.
You must show your working.

(b) ..... m/s **[5]**

5. June/2022/Paper_J560/06/No.8(b)

1600 fish are released into a new lake which has no fish.
The number of fish is expected to increase by 5% each year.

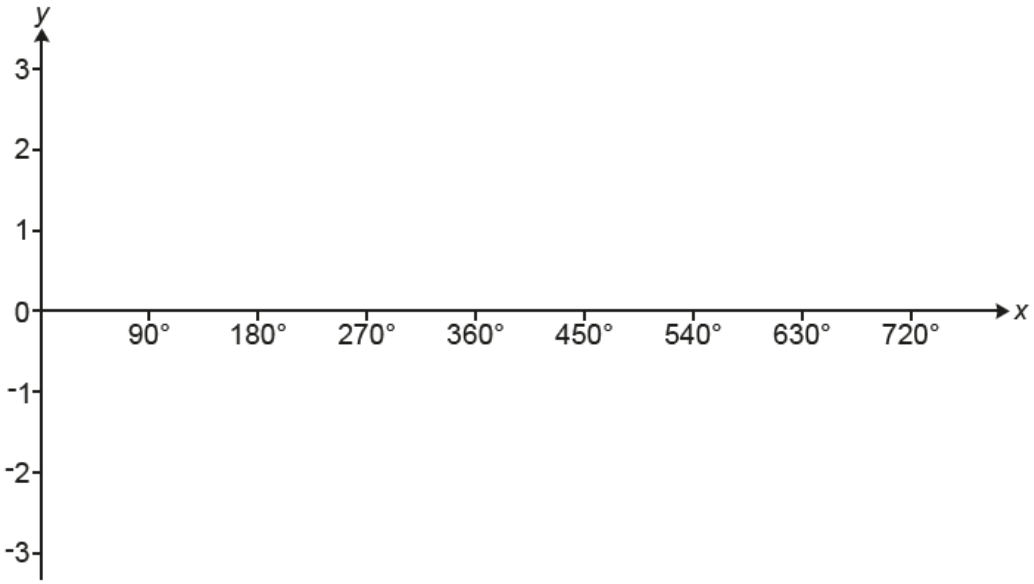
(b) Use the table to draw a suitable graph to show the expected number of fish in the lake.



[3]

6. June/2022/Paper_J560/06/No.14

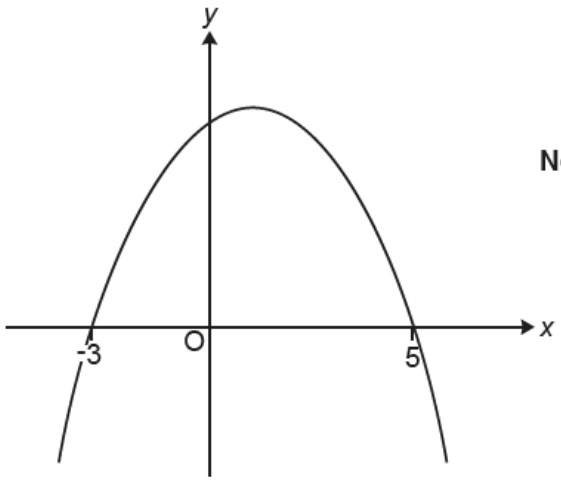
Sketch the graph of $y = \cos x - 1$ for $0° \leqslant x \leqslant 720°$.



[3]

7. June/2022/Paper_J560/06/No.16

Frankie sketches this quadratic graph.



Not to scale

Frankie says

The y-intercept is 15.

(a) Show that what Frankie says could be correct. **[3]**

(b) Explain why what Frankie says may **not** be correct.

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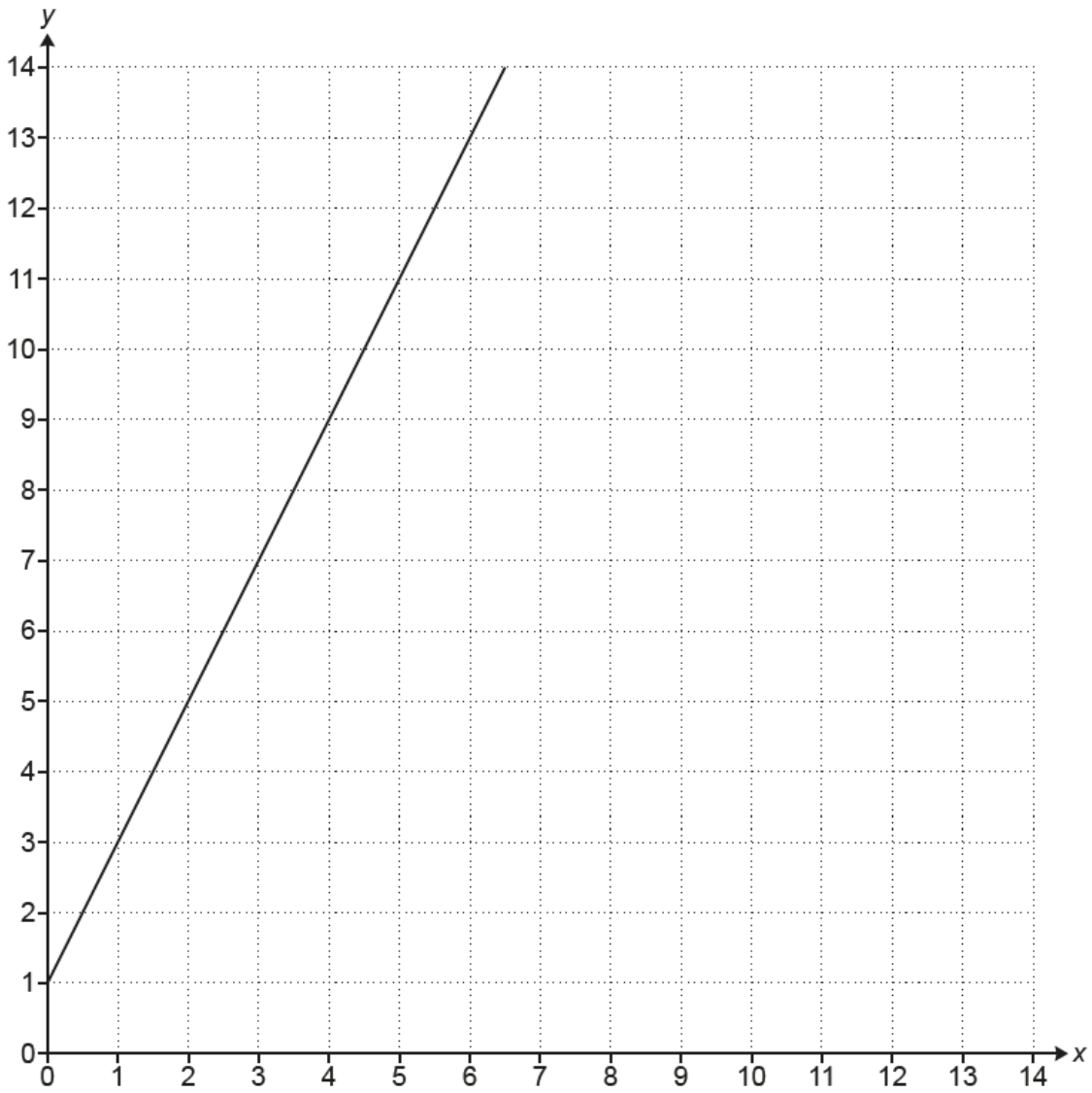
..... **[2]**

8. June/2022/Paper_J560/06/No.18

The graph of $y = 2x + 1$ is drawn on this one centimetre grid.



The region **R** satisfies these inequalities.

$y \leqslant 2x + 1$
$y \geqslant 5$
$x + y \leqslant 13$

Show that the area of region **R** is $12\,\text{cm}^2$. **[6]**