

Exercise walk-through

E3.5

Equations of linear graphs

IGCSE Mathematics

You must be able to

- write down the equation of a line from its gradient and y -intercept
- rearrange an equation into the form $y = mx + c$ before reading m and c
- find the equation of the line through two points, and where a line crosses the axes

1

The method

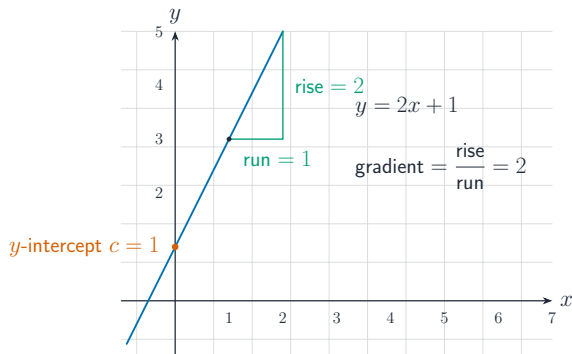
Method — Rearrange to $y = mx + c$ FIRST, then read it off

- **The form:** $y = mx + c$, where m is the gradient and c the y -intercept.
- **Rearrange first.** From $2y = 6x - 5$ divide everything by 2: $y = 3x - 2.5$, so $m = 3$ and $c = -2.5$. Reading $m = 6$ off the original is the standard error.
- **Through two points:** find m from the gradient formula, then substitute ONE of the points to find c .
- **Axes:** the y -axis is where $x = 0$; the x -axis is where $y = 0$.

Answer shapes (marked by **method marks** — M1 for a correct method, A1 for the correct answer): the gradient, and the substitution used to find c , are separate method marks.

Method — Rearrange to $y = mx + c$ FIRST, then read it off

Answer shapes (marked by method marks — M1 for a correct method, A1 for the correct answer): the gradient,...



A line on a grid with its gradient and y-intercept marked

2

Practice

Practice 2.1 ■ 1 mark

Write down the equation of the line with gradient 4 and y -intercept -3 .

Solution 2.1

Method: Rearrange to $y = mx + c$ FIRST, then read it off — p.4

Worked steps

- substitute $m = 4$ and $c = -3$

$$y = 4x - 3$$

B1

Practice 2.2 ■ 2 marks

Find the gradient and the y -intercept of the line $2y = 6x - 5$.

Solution 2.2

Method: Rearrange to $y = mx + c$ FIRST, then read it off — p.4

Worked steps

- divide the whole equation by 2: $y = 3x - 2.5$ **M1**

$$m = 3, \quad c = -2.5$$

A1

Practice 2.3 ■ 1 mark

Find the equation of the line through $(0, 5)$ with gradient -2 .

Solution 2.3

Method: Rearrange to $y = mx + c$ FIRST, then read it off — p.4

Worked steps

- the point $(0, 5)$ IS the y -intercept, so $c = 5$

$$y = -2x + 5$$

B1

3

Exam-style

Exam-style 3.1 ■ 5 marks

A line passes through $A(1, 4)$ and $B(5, 16)$.

Exam-style 3.1 (a) ■ 2 marks

Find the gradient of the line.

Solution 3.1 (a)

Method: Rearrange to $y = mx + c$ FIRST, then read it off — p.4

Worked steps

$$\blacksquare \frac{16 - 4}{5 - 1} = \frac{12}{4} \quad \text{M1}$$

$$= 3$$

A1

Exam-style 3.1 (b) ■ 3 marks

Find the equation of the line in the form $y = mx + c$.

Solution 3.1 (b)

Worked steps

■ $y = 3x + c$, and substituting $A(1, 4)$ gives $4 = 3(1) + c$ **M1**

■ $c = 1$ **M1**

$$y = 3x + 1$$

A1

■ check with B : $3(5) + 1 = 16$, which matches

Exam-style 3.2 ■ 3 marks

The line $y = 2x - 6$ crosses the axes at two points.

Exam-style 3.2 (a) ■ 1 mark

Write down the coordinates of the point where it crosses the y -axis.

Solution 3.2 (a)

Method: Rearrange to $y = mx + c$ FIRST, then read it off — p.4

Worked steps

- the y -intercept is $c = -6$

(0, -6)

B1

Exam-style 3.2 (b) ■ 2 marks

Find the coordinates of the point where it crosses the x -axis.

Solution 3.2 (b)

Worked steps

■ set $y = 0$: $0 = 2x - 6$ M1

$x = 3$, so **(3, 0)** A1