

Exercise walk-through

C3.5

Equations of linear graphs

IGCSE Mathematics

You must be able to

- Read gradient and intercept from a line equation or graph
- Write fully simplified equations of straight lines
- Recognise vertical lines in the form $x = k$

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The method

Method — Key knowledge: Equations of linear graphs

In $y = mx + c$, m is gradient and c is the y -intercept. To find a line equation from a graph, read the intercept and calculate the gradient from a slope triangle. Simplify the equation fully. A horizontal line is $y = k$; a vertical line is $x = k$, not $y = k$.

Exercises 2.1·2.3

2.1 State the gradient and y -intercept of $y = 5x - 3$. [2]

2.2 A line has gradient -2 and y -intercept 6 . Give its equation. [2]

2.3 Give the equation of the vertical line through $(4, -1)$. [2]

Exercises 2.1·2.3

2.1 State the gradient and y -intercept of $y = 5x - 3$. [2]

2.1

- Compare with $y = mx + c$: $m = 5$, intercept $(0, -3)$.
-

2.2 A line has gradient -2 and y -intercept 6 . Give its equation. [2]

2.2

- $y = mx + c$ gives $y = -2x + 6$.
-

2.3 Give the equation of the vertical line through $(4, -1)$. [2]

2.3

- Every point has the same x : $x = 4$.

Exercise 2.4

2.4 Give the equation of the horizontal line through $(2, -5)$.

[2]

3 Exam-style questions

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2.4

- Every point has the same y : $y = -5$.

Exercise 3.1 (a)

3.1 Apply the equations of linear graphs methods below. Show working and include units where appropriate.

(a) On graph paper, draw the line through $(0, -2)$, $(2, 2)$, $(4, 6)$. Read its y -intercept. [2]

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(a) On graph paper, draw the line through $(0, -2)$, $(2, 2)$, $(4, 6)$. Read its y -intercept. [2]

(a)

- The y -axis crossing is $(0, -2)$, so $c = -2$.

Exercise 3.1 (b)

3.1 Apply the equations of linear graphs methods below. Show working and include units where appropriate.

(b) Find the gradient from a slope triangle.

[2]

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(b) Find the gradient from a slope triangle.

[2]

(b)

- Run 2 and rise 4 give $m = 4/2 = \mathbf{2}$.

Exercise 3.1 (c)

3.1 Apply the equations of linear graphs methods below. Show working and include units where appropriate.

(c) Write its equation and check it using $(4, 6)$.

[2]

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(c) Write its equation and check it using $(4, 6)$.

[2]

(c)

- $y = 2x - 2$. Check: $y = 2(4) - 2 = 6$.

Exercise 3.2 (a)

3.2 On graph paper draw the line through $(0,4)$, $(2,1)$ and $(4,-2)$.

(a) Read its vertical intercept and find its gradient using a grid slope triangle. Write its equation. [3]

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(a)

- Intercept **4**.
- A grid triangle gives $m = (1 - 4)/(2 - 0) = -\mathbf{3/2}$.
- Thus $y = -\mathbf{1.5x} + \mathbf{4}$.

Exercise 3.2 (b)

3.2 On graph paper draw the line through $(0,4)$, $(2,1)$ and $(4,-2)$.

(b) Write the equation of the vertical line through $(-3,2)$. Explain why $y = -3$ is a different line. [3]

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(b) Write the equation of the vertical line through $(-3,2)$. Explain why $y = -3$ is a different line. [3]

(b)

- The vertical line is $x = -3$: every point has x-coordinate -3 .
- The equation $y = -3$ instead describes a horizontal line with constant y .