eClassroom

GCSE Mathematics

Linear Graphs

Questions

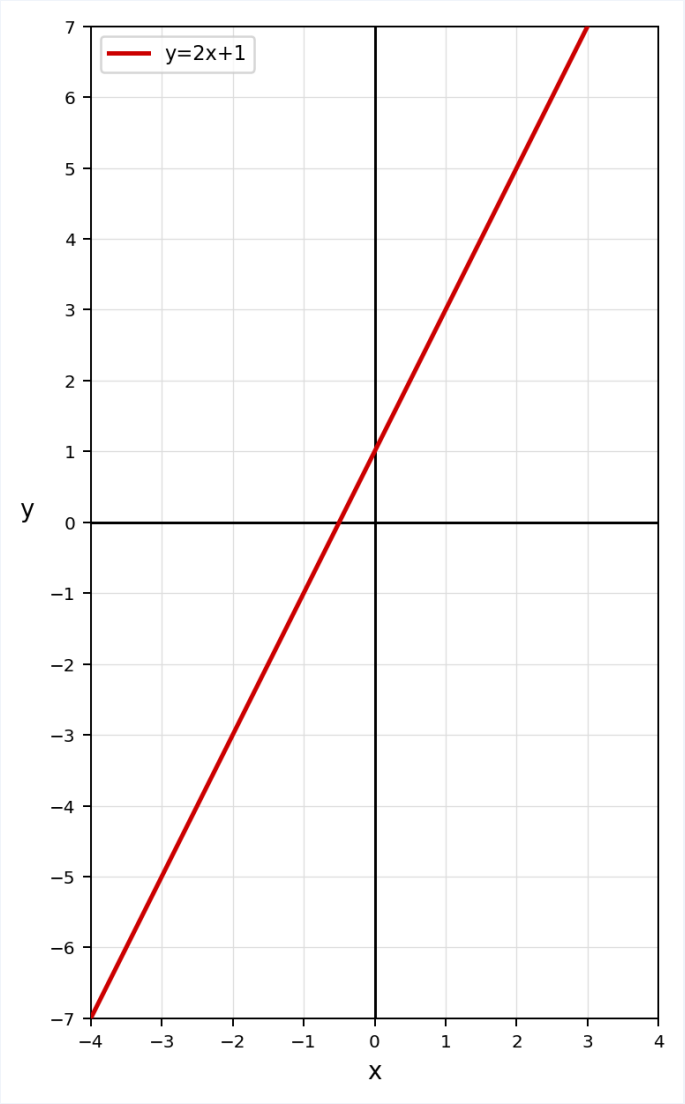
Pearson Edexcel GCSE & iGCSE Mathematics

Section A — Foundation

Worked Examples

[Fluency]

Draw the graph of $y = 2x + 1$ for $-3 \leq x \leq 3$.



[Reasoning]

Find the gradient of the line through (1,3) and (4,9).

$$m = \frac{9-3}{4-1} = \frac{6}{3} = \mathbf{2}$$

[Problem Solving]

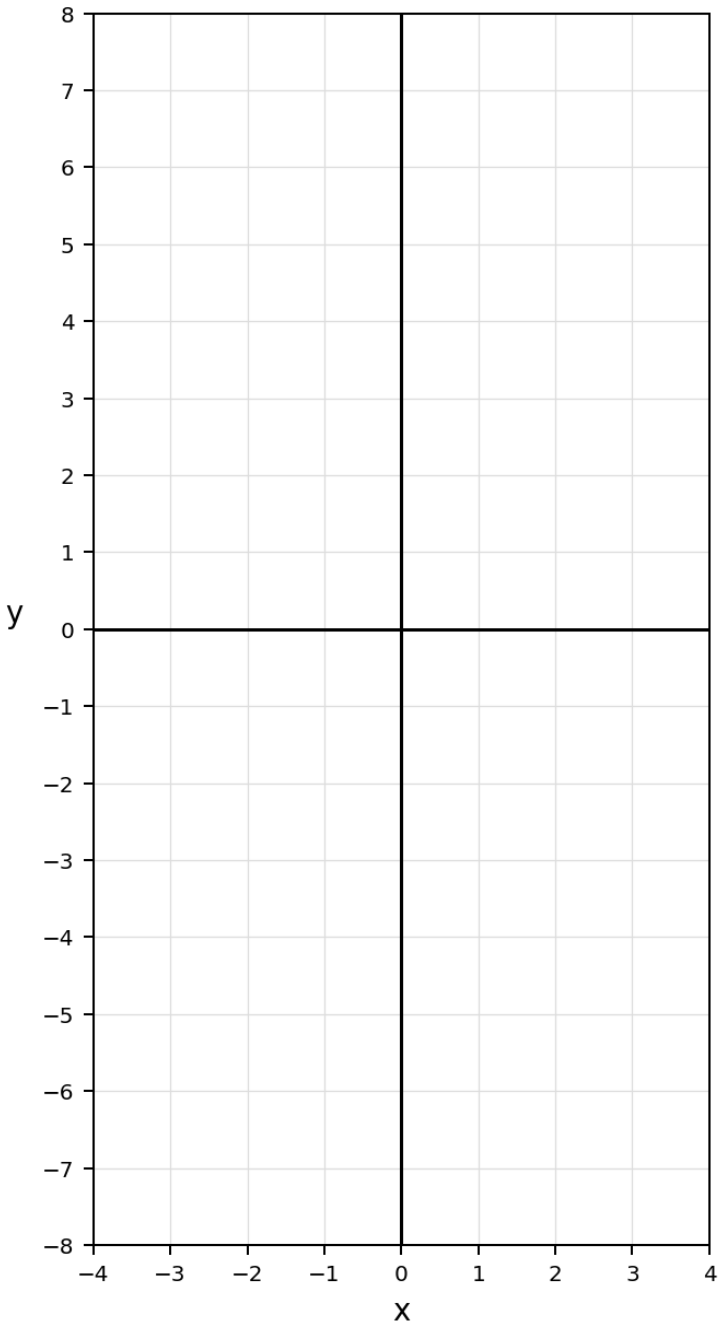
Are $y = 3x + 1$ and $y = 3x - 5$ parallel? Give a reason.

Both have gradient **3** → **Yes, they are parallel.**

[Fluency]

1.

Draw the graph of $y = 2x + 1$ for $-3 \leq x \leq 3$.

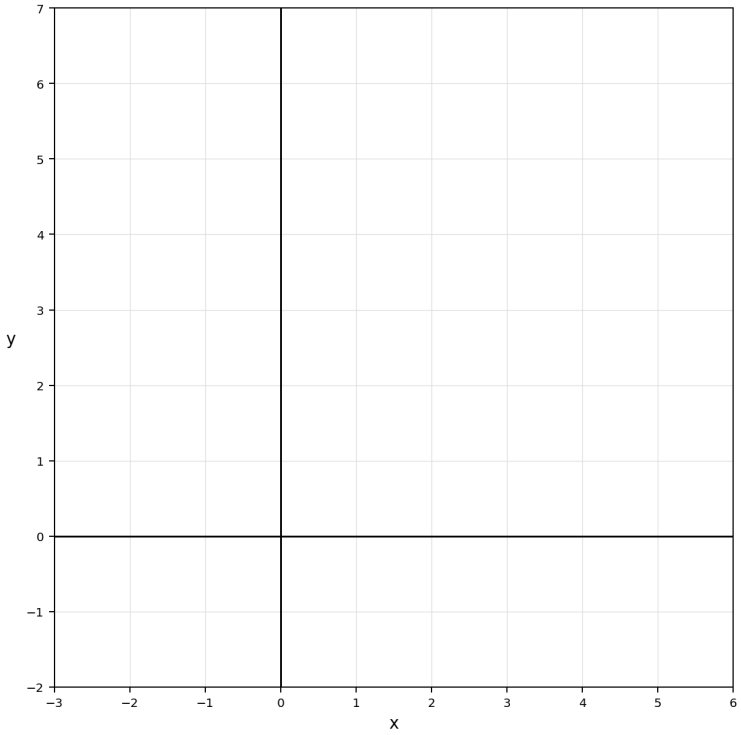


(3 marks)

[Fluency]

2.

Draw the graph of $y = -x + 4$ for $-2 \leq x \leq 5$.



(3 marks)

[Fluency]

3. Find the gradient and y-intercept of the line $y = 4x - 3$.

(2 marks)

[Fluency]

4. Find the gradient of the line passing through (2, 5) and (6, 13).

(2 marks)

[Fluency]

5.

Write the equation of the line with gradient 3 passing through (0, –2).

(2 marks)

[Reasoning]

6.

State whether each pair of lines is parallel, perpendicular or neither:

(a) $y = 2x + 1$ and $y = 2x - 5$ (1)

(b) $y = 3x + 2$ and $y = -x/3 + 1$ (1)

(c) $y = 4x - 1$ and $y = 2x + 3$ (1)

(3 marks)

[Reasoning]

7.

The line y = mx + c passes through (1, 5) and (3, 11).
Find the values of m and c.

(3 marks)

[Reasoning]

8.

A taxi firm charges a fixed fee of £3 plus £2 per mile.

(a) Write a formula for the cost C in terms of miles m. (1)

(b) Sketch the graph of C against m. (2)

(c) What does the gradient represent in context? (1)

(4 marks)

[Problem Solving]

9.

A line passes through (0, 4) and (5, 0).
Find the equation of the line.

(3 marks)

[Problem Solving]

10.

The graph of y = 3x – 2 and y = x + 4 are drawn on the same axes.
Find the coordinates of their point of intersection.

(3 marks)

Section B — Higher

Worked Examples

[Fluency]

Find the equation of the line through (2, 5) and (6, 13).

$$m = \frac{13-5}{6-2} = 2 \quad c = 5 - 2(2) = 1 \quad \Rightarrow y = 2x + 1$$

[Reasoning]

Find the equation perpendicular to y = 3x + 1 through (0, 2).

$$m_{\perp} = -\frac{1}{3} \quad \Rightarrow y = -\frac{x}{3} + 2$$

[Problem Solving]

A car travels at constant speed. After 2 hours it has travelled 90 km. After 5 hours it has travelled 225 km. Find its speed using the gradient.

$$m = \frac{225-90}{5-2} = \frac{135}{3} = \mathbf{45}\ \text{km/h}$$

[Fluency]

1. Find the equation of the line passing through (2, 5) and (6, 13).

(3 marks)

[Fluency]

2.

Find the equation of the line perpendicular to y = 3x + 1 that passes through (0, 2).

(3 marks)

[Fluency]

3.

Find the equation of the line parallel to y = 5x – 3 that passes through (1, 4).

(3 marks)

[Reasoning]

4.

Show that the line through (1, 3) and (4, 9) is parallel to the line through (0, 1) and (3, 7).

(3 marks)

[Reasoning]

5.

A straight line has equation $3x + 2y = 12$.

(a) Rearrange into the form $y = mx + c$. (2)

(b) Find the gradient and y-intercept. (1)

(c) Find the x-intercept. (1)

(4 marks)

[Reasoning]

6.

A line has gradient -2 and passes through $(3, 4)$.

Find the equation of the line in the form $ax + by + c = 0$ where a, b and c are integers.

(4 marks)

[Problem Solving]

7.

A water tank contains 200 litres at the start. Water is drained at 15 litres per minute.

(a) Write an equation for the volume V after t minutes. (2)

(b) Find the gradient and explain its meaning in context. (2)

(c) When is the tank empty? (2)

(6 marks)

[Problem Solving]

8.

Triangle ABC has vertices A(0,2), B(4,0), C(2,6).

(a) Find the equation of each side. (6)

(b) Show that angle ABC = 90° using gradients. (3)

(9 marks)