

Straight line equations

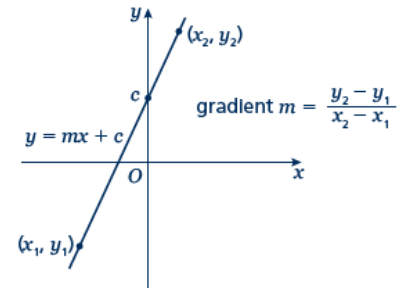
A LEVEL LINKS

Scheme of work: 2a. Straight-line graphs, parallel/perpendicular, length and area problems

Key points

- A straight line has the equation $y = mx + c$, where m is the gradient and c is the y -intercept (where $x = 0$).
- The equation of a straight line can be written in the form $ax + by + c = 0$, where a , b and c are integers.
- When given the coordinates (x_1, y_1) and (x_2, y_2) of two points on a line the gradient is calculated using the

$$\text{formula } m = \frac{y_2 - y_1}{x_2 - x_1}$$



Practice questions

- 1 Write these lines in the form $ax + by + c = 0$.
 - a $y = 3x + 5$
 - b $y = -\frac{1}{2}x - 7$
 - c $2y = 4x - 3$
 - d $x + y = 5$
 - e $y = \frac{1}{2}x - \frac{3}{4}$
 - f $3y = \frac{2}{3}x - 2$
- 2 Find, in the form $ax + by + c = 0$ where a , b and c are integers, an equation for each of the lines with the following gradients and y -intercepts.
 - a gradient $-\frac{1}{2}$, y -intercept -7
 - b gradient 2 , y -intercept 0
 - c gradient $\frac{2}{3}$, y -intercept 4
 - d gradient -1.2 , y -intercept -2

Answers

1 **a** $3x - y + 5 = 0$ **b** $x + 2y + 14 = 0$
 c $4x - 2y - 3 = 0$ **d** $x + y - 5 = 0$
 e $2x - 4y - 3 = 0$ **f** $2x - 9y - 6 = 0$

2 **a** $x + 2y + 14 = 0$ **b** $2x - y = 0$
 c $2x - 3y + 12 = 0$ **d** $6x + 5y + 10 = 0$