

The equation of a straight line can be written in the form  $y = mx + c$

where  $m$  is the gradient and  $c$  is the  $y$ -intercept.

A straight line can also be written in the form

$$y - y_1 = m(x - x_1)$$

where  $(x_1, y_1)$  is a point on the line and  $m$  is the gradient.

**Key point**

You can rearrange the general equation of a straight line to get a formula for the gradient.

The gradient of a straight line through two points

$$(x_1, y_1) \text{ and } (x_2, y_2) \text{ is } m = \frac{y_2 - y_1}{x_2 - x_1}$$

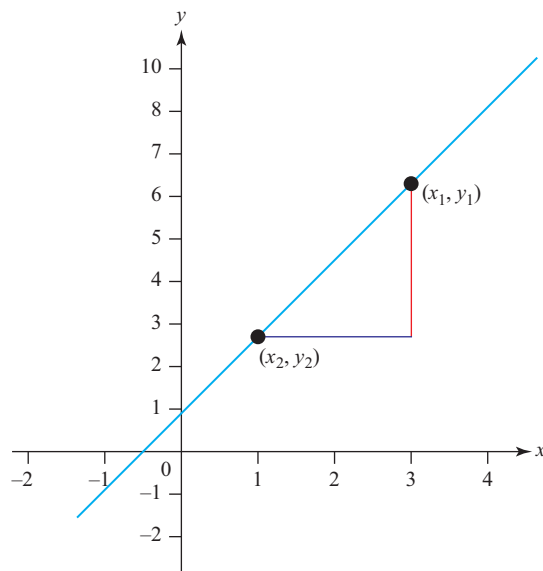
**Key point**

You can use Pythagoras' theorem to find the distance between two points.

The distance between two points  $(x_1, y_1)$  and  $(x_2, y_2)$  is

given by the formula  $\sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$

**Key point**



The coordinates of the midpoint of the line joining

$(x_1, y_1)$  and  $(x_2, y_2)$  are given by the formula

$$\left( \frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

**Key point**

You can use the gradients of two lines to decide if they are **parallel** or **perpendicular**.

**Key point**

Two lines are described by the equations

$$y_1 = m_1x + c_1 \text{ and } y_2 = m_2x + c_2$$

If  $m_1 = m_2$ , the two lines are parallel.

If  $m_1 \times m_2 = -1$ , the two lines are perpendicular.