

Straight-line graphs

Topic cliff notes / objectives, key ideas and examples

Learning objectives

- Identify a gradient and vertical intercept.
- Find the equation of a line from two points.

Key ideas

- The gradient is the coefficient of the horizontal variable; the constant is the vertical intercept.

$$y = mx + c$$

- Gradient is vertical change divided by horizontal change.

$$m = \frac{y_2 - y_1}{x_2 - x_1} \quad (x_2 \neq x_1)$$

- Find the vertical intercept by substituting a point into the line equation.
- Distinct parallel non-vertical lines have equal gradients. A vertical line has undefined gradient.
- Coordinates give the horizontal position first.

$$(x, y)$$

Worked example

Find the line through the two given points.

$$(1, 5), (3, 9) : \quad m = \frac{9 - 5}{3 - 1} = 2$$

Substitute the first point.

$$5 = 2(1) + c \implies c = 3$$

Check the second point.

$$2(3) + 3 = 9$$

Answer

$$y = 2x + 3$$

Quick example

Substitute a negative horizontal coordinate.

$$y = 4x + 1, \quad x = -2 : \quad y = 4(-2) + 1 = -7$$

Answer

$$y = -7$$

Watch out

The constant is the vertical intercept, not the gradient. Keep brackets around negative values when substituting.

