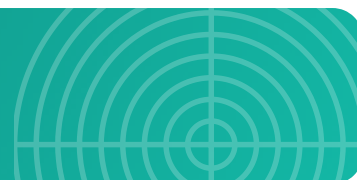


Coordinate geometry

Cambridge IGCSE Maths (0580) · Knowledge organiser



KEY DEFINITIONS

Gradient

The steepness of a line: change in $y \div$ change in x .

y-intercept

Where a line crosses the y -axis: c in $y = mx + c$.

Parallel lines

Lines with the same gradient.

Perpendicular lines

Lines at right angles; their gradients multiply to -1 .

KEY FORMULAS

Straight line: $y = mx + c$, gradient m , y -intercept c ; vertical line $x = k$

Gradient from two points $m = \frac{y_2 - y_1}{x_2 - x_1}$

Midpoint; length $\left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2}\right), \sqrt{(x_2 - x_1)^2 + (y_2 - y_1)^2}$

Parallel lines $m_1 = m_2$

Perpendicular lines $m_1 \times m_2 = -1$

YOU SHOULD BE ABLE TO...

- Plot points in all four quadrants and draw straight-line graphs from equations by completing a table of values.
- Find the gradient of a straight line from its graph and from the coordinates of two points on it.
- Interpret and find equations of straight lines in the forms $y = mx + c$ and $x = k$ from graphs and descriptions.
- Calculate the length and the midpoint of a line segment from the coordinates of its end points.
- Use the fact that parallel lines have equal gradients to find the equation of a line parallel to a given line through a given point.
- Use the gradient rule $m_1 \times m_2 = -1$ to find equations of perpendicular lines and of the perpendicular bisector of a line segment.

WORKED EXAMPLE

Find the equation of the line through (1, 2) and (3, 8).

1. $m = (8 - 2)/(3 - 1) = 3$

2. $y = 3x + c$ through (1, 2): $2 = 3 + c$, so $c = -1$

Answer: $y = 3x - 1$

COMMON MISTAKES

- ✗ Gradient worked out as change in x over change in y
- ✗ Using the same gradient for a perpendicular line instead of the negative reciprocal