

OCR Core 1

Coordinate geometry

Section 1: Coordinates, points and lines

Crucial points

1. **Ensure you can calculate the gradient of the line correctly.**

The gradient of a line, m , is given by

$$m = \frac{\text{change in } y}{\text{change in } x}$$

The gradient, m , of the line joining two points, (x_1, y_1) and (x_2, y_2) is given by

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

Don't get the gradient calculation upside-down! The gradient tells you by how much y changes when x increases by 1.

2. **Make sure you can calculate the y-intercept of a straight-line graph.**

The y -intercept of a line is where it crosses the y -axis. It is the value of y when $x = 0$.

3. **Make sure you understand how the standard straight-line equation works.**

An equation which can be written in the form $y = mx + c$ represents a straight line. m is the gradient and c is the y -intercept.

4. **Make sure you understand the conditions on the gradients of lines for the lines to be parallel or perpendicular.**

If two lines have gradients m_1 and m_2 then:

- the lines are **parallel** if $m_1 = m_2$.
- the lines are **perpendicular** if $m_1 m_2 = -1$ (i.e. if $m_2 = -\frac{1}{m_1}$).

5. **Make sure you understand and can remember how to calculate the distance between two points**

The distance, d , between two points, (x_1, y_1) and (x_2, y_2) is given by

$$d = \sqrt{(x_1 - x_2)^2 + (y_1 - y_2)^2}$$

This is just from applying Pythagoras's theorem

6. **Make sure you understand and can remember how to calculate the midpoint of the line between two points.**

The coordinates of the midpoint, M , of the line joining (x_1, y_1) and (x_2, y_2)

are given by
$$M = \left(\frac{x_1 + x_2}{2}, \frac{y_1 + y_2}{2} \right)$$

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7. **Make sure you can calculate the equation of a straight line.**

- from the coordinates of two points on it.
- from its gradient and the coordinates of a point on it.

8. **Draw diagrams**

When you are dealing with coordinate geometry problems, a diagram is very helpful.