

# OCR Core 1

## Coordinate Geometry

### Glossary

#### Chord

A straight line joining two points on the circumference of a circle.

#### Coordinates

A means of describing a position relative to some fixed point (the origin).

In Cartesian coordinates position is given in terms of two perpendicular directions,  $x$  and  $y$ .

#### Equation of a circle

The equation of a circle with centre  $(a, b)$  and radius  $r$  is given by

$$(x-a)^2 + (y-b)^2 = r^2$$

When the centre of the circle is at the origin, the equation simplifies to

$$x^2 + y^2 = r^2$$

#### Equation of a straight line

The equation of a straight line with **gradient**  $m$  which intercepts the  $y$ -axis at the point  $(0, c)$  is given by

$$y = mx + c$$

The equation of a straight line with gradient  $m$  which passes through the point  $(x_1, y_1)$  is given by

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

#### Gradient of a line

The gradient of a line, often denoted by  $m$ , is a measure of its slope.

For two points A  $(x_1, y_1)$  and B  $(x_2, y_2)$  on a straight line, the gradient of the line is given by

$$\begin{aligned} \text{gradient} &= \frac{\text{increase in } y \text{ from A to B}}{\text{increase in } x \text{ from A to B}} \\ &= \frac{y_2 - y_1}{x_2 - x_1} \end{aligned}$$

# OCR C1 Coordinate geometry glossary

## Intersection of two lines or curves

The point(s) where two lines or curves intersect can be found by solving their equations simultaneously.

If two points of intersection are the same, then the line just touches the curve (i.e. it is a **tangent** to the curve).

## Midpoint of a line

The point halfway between the two ends of a line.

For any two points A  $(x_1, y_1)$  and B  $(x_2, y_2)$ , the midpoint M of the line AB is given by

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

## Parallel lines

If two lines are parallel, they have the same **gradient**.

## Perpendicular bisector of a line

For a line AB, the perpendicular bisector of AB is **perpendicular** to AB and passes through the **midpoint** of AB.

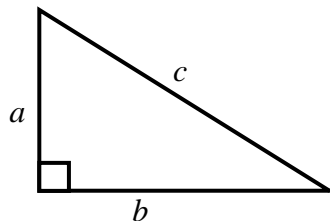
## Perpendicular lines

Two perpendicular lines are at right angles to each other.

If two lines with **gradients**  $m_1$  and  $m_2$  are perpendicular, then  $m_1 m_2 = -1$ .

## Pythagoras' theorem

In a right-angled triangle with side lengths  $a$ ,  $b$  and  $c$  ( $c$  being the hypoteneuse)



Pythagoras' theorem states that

$$a^2 + b^2 = c^2$$

## Tangent

A tangent to a curve is a straight line which just touches the curve.

The tangent to a circle at any point is **perpendicular** to the radius of the circle through that point.