

Coordinate Geometry

Distance between two points:

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

Midpoint of a straight line (or two coordinates):

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

Gradient of a straight line:

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

Forms of equation of a straight line:

$y = mx + c$ - the standard equation, shows gradient and y-intercept

$y - y_1 = m(x - x_1)$ - useful for finding c value

$ax + by + c = 0$ - more elegant than involving fractions

Perpendicular lines:

$$m_1 \times m_2 = -1$$

(the negative reciprocal rule)

Equation of a circle:

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

where (a, b) = centre and r = radius

Angle between line and horizontal:

$$\tan^{-1} \left(\frac{y_2 - y_1}{x_2 - x_1} \right) = \tan^{-1}(\text{gradient})$$