KC Notes **Mathematics**

Year 10 Co-ordinate Geometry

Midpoint Formula

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

This formula is similar to counting the **average** of x and y in a line.

Distance Formula

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

This formula is from the Pythagoras Theorem; used by constructing a right angle triangle, measuring hypotenuse.

Gradient Formula

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

This is known as $\frac{rise}{run}$.

Gradient Intercept Form

$$y = mx + b$$

where m is the gradient
b is the y-intercept

General Form

$$ax + by + c = 0$$

where a is a positive number
a, b and c are whole numbers

Point Gradient Formula

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

where m is the gradient
y_1 is the y co-ordinate of a point
x_1 is the x co-ordinate of the above point

Note: Do not sub in any points into x or y, as they are used for the formula

When given 2 points, first find the gradient by using the Gradient Formula, and then use the Point Gradient Formula above.

Manipulating Gradients

$m_1 = m_2$ is used for finding whether two lines are **parallel**. Their gradients should be the same.

$m_1 \times m_2 = -1$ is used for finding whether two lines are **perpendicular**.