Linear Graphs

Chapter Overview

1. $y = mx + c$

2. Parallel and perpendicular lines

3. Lengths and Areas

4. Modelling

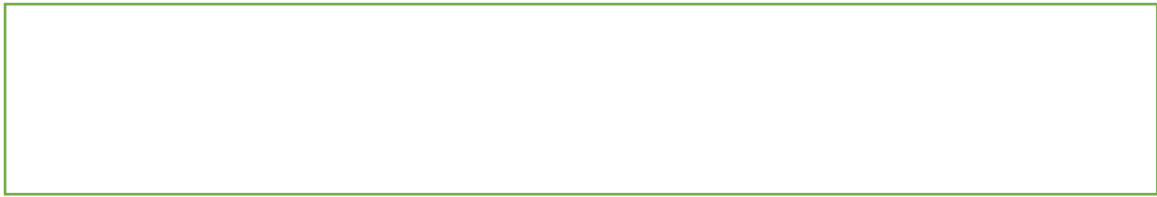| 3.1 | Understand and use the equation of a straight line, including the forms $y - y_1 = m(x - x_1)$ and $ax + by + c = 0$; | To include the equation of a line through two given points, and the equation of a line parallel (or perpendicular) to a given line through a given point. |
| | Gradient conditions for two straight lines to be parallel or perpendicular. | $m' = m$ for parallel lines and $m' = -\dfrac{1}{m}$ for perpendicular lines |
| | Be able to use straight line models in a variety of contexts. | For example, the line for converting degrees Celsius to degrees Fahrenheit, distance against time for constant speed, etc. |

1. Linear Graphs

Examples:

1. The point $(5, a)$ lies on the line with equation $y = 3x + 2$. Determine the value of a.

2. Find the coordinate of the point where the line $2x + y = 5$ cuts the x-axis.

Test Your Understanding:

Determine where the line $x + 2y = 3$ crosses both the axes

Gradient

Examples:

Find the gradient of the line between the following sets of points:

1. $(1, 4)$ $(3, 10)$
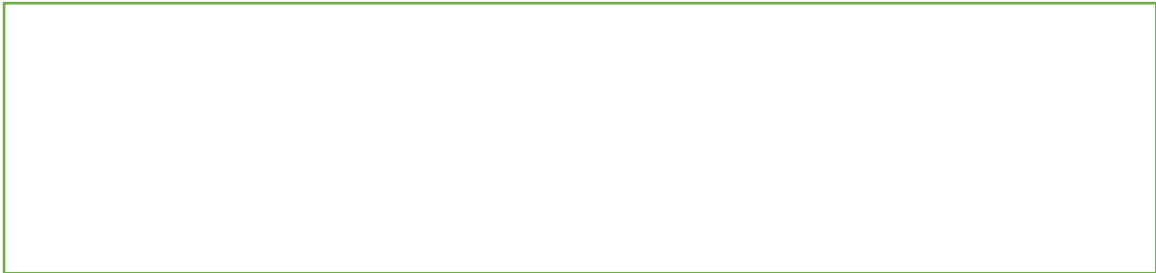
2. $(5, 7)$ $(8, 1)$

3. $(2, 2)$ $(-1, 10)$

4. Show that the points $A(3,4), B(5,5), C(11,8)$ all lie on a straight line.

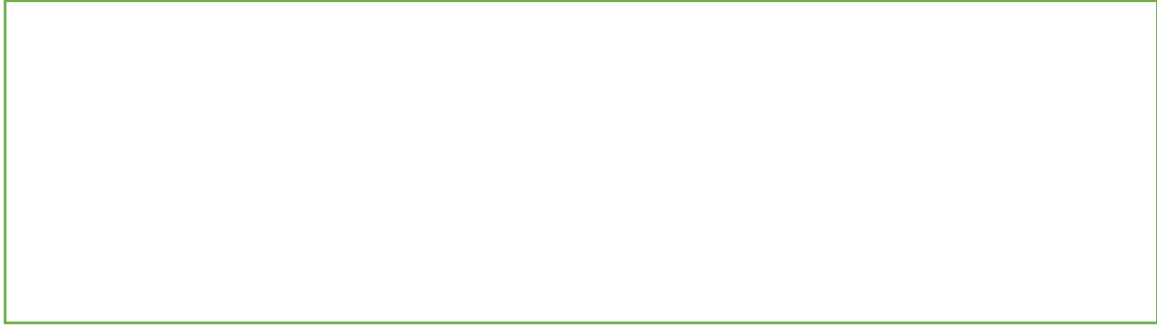5. The line joining $(2, -5)$ to $(4, a)$ has gradient -1. Work out the value of a.

$\underline{y = mx + c}$

Example:

Determine the gradient and y-intercept of the line with equation $4x - 3y + 5 = 0$

$\underline{ax + by + c = 0}$

Example

Express $y = \frac{1}{3}x - \frac{2}{3}$ in the form $ax + by + c = 0$, where a, b, c are integers.

Test Your Understanding

Express $y = \frac{2}{5}x + \frac{3}{5}$ in the form $ax + by + c = 0$, where a, b, c are integers.