

10 - Linear Graphs

$$y = mx + c$$

m = Gradient = change in y ÷ change in x
= up ÷ across

So to calculate the gradient, find 2 points along the line, then work out change in y and change in x
e.g. (3,3) and (7,5)

$$\text{Gradient} = \frac{y-y}{x-x} = \frac{3-5}{3-7} = \frac{-2}{-4} = \frac{1}{2}$$

c = y axis intercept

To work out the value of C in order to plot the graph, work out the gradient, then substitute known x and y values as well as the gradient to find out c.

e.g. Given = (0,1), (1,3)

$$\text{Gradient} = \frac{1-3}{0-1} = 2 = m$$

$$y = 2x + c$$

$$3 = 2(1) + c$$

$$3 = 2 + c$$

$$c = 1$$

$$y = 2x + 1$$

* When x = 0, y always = c

e.g. given (0,5), c = 5

Cover up Method

1. Choose a given y or x value and replace with 0

2. Cover up $\rightarrow x + y = 8$

$$0 + y = 8$$

So if x is 0, y = 8

3. Place into co-ordinate $\rightarrow (0,8)$

4. Do the same to y $\rightarrow x + y = 8$

$$x + 0 = 8$$

So if y is 0, x = 8

5. Place into co-ordinate(8,0)

6. Now you have two co-ordinates, use them to plot the line.

Perpendicular lines

= Negative reciprocals of each other

e.g. $y = 3x + 4$ and $y = -\frac{1}{3}x + 6$

*intercept value does not matter

If lines are perpendicular, when you multiply the gradients, they should = -1

$$m_1 \times m_2 = -1 \quad \text{e.g. } 3 \times -\frac{1}{3} = -1$$

Parallel Lines

Parallel lines have the **same gradient** value

so $y = 2x + 5$ is parallel to $y = 2x - 7$

Solving simultaneous equations graphically

Plot both equations on graph - using chosen method e.g. elimination/substitution

Where they intersect, the co-ordinate is the y and x values of the simultaneous equation

e.g. (6,7)

$x = 6, y = 7$

Max Speed = Greatest ÷ Shortest