

Y9 Maths Knowledge Organiser Topic 5: Linear and Conversion Graphs

What must I be able to do?	Key vocabulary
New content: <ul style="list-style-type: none"> □ Work out the equations of horizontal and vertical lines <ul style="list-style-type: none"> ➤ Maths watch 96 (GCSE) □ Plot a linear graph from its equation using a table, gradient/intercept and coverup method <ul style="list-style-type: none"> ➤ Mathswatch 96 (GCSE) □ Work out the gradient of a straight line <ul style="list-style-type: none"> ➤ Mathswatch 97 (GCSE) □ Convert from one unit to another unit by using a conversion graph <ul style="list-style-type: none"> ➤ Mathswatch 107 (GCSE) □ Draw and interpret information, including gradients, from graphs of real-life situations <ul style="list-style-type: none"> ➤ Mathswatch 107 (GCSE) □ Work out the equation of a straight line from a graph <ul style="list-style-type: none"> ➤ Mathswatch 159a, 159b (GCSE) 	Horizontal A <u>left-right</u> direction. Vertical An <u>up-down</u> direction. Linear graph A linear equation with 2 variables, usually x and y. When plotted it will form a <u>straight line</u> . Gradient The <u>steepness</u> of a graph. Intercept The point at which a graph <u>crosses the y-axis</u> .

Horizontal and vertical lines

Horizontal: $y = \text{constant}$
e.g. $y=2$

Vertical: $x = \text{constant}$
e.g. $x=4$

Finding the equation of a graph

The general form of the equation of a straight line graph is $y = mx + c$ where m is the gradient and c is the y -intercept.

Gradient is $3 \div 1 = 3$ so $m = 3$
It crosses at $(0, -1)$ so $c = -1$
So the equation is $y = 3x - 1$

Calculating the gradient

Draw a right angled triangle between 2 points.
The gradient equals: $\frac{\text{change in } y}{\text{change in } x}$
e.g. $2 \div 1 = 2$
The gradient is 2

This graph slopes up from left to right so the gradient is positive. If it sloped up from right to left the gradient would be negative.

e.g. $4 \div -2 = -2$
The gradient is -2

Plotting graphs

From a table - substitute each x value into the equation to generate each coordinate to plot. e.g. $y = 2x + 1$

When $x = 0, y = 2 \times 0 + 1 = 1$ When $x = 2, y = 2 \times 2 + 1 = 5$

x	0	1	2	3
y	1	3	5	7

When $x = 1, y = 2 \times 1 + 1 = 3$ When $x = 3, y = 2 \times 3 + 1 = 7$
Coordinates to plot at $(0, 1), (1, 3), (2, 5)$ and $(3, 7)$. Join with a straight line.

Gradient/intercept - first ensure the equation of the line is in the form $y = mx + c$. e.g. $y = 4x + 2$. We know $m = 4$ and $c = 2$.

Plot the intercept at $(0, 2)$. As the gradient is 4, it will travel 4 units upwards for each unit to the right. So 4 units up and 1 to the right of $(0, 2)$ is $(1, 6)$. The next is $(2, 10)$. Plot and join up with a straight line.

Not the intercept as not in the form $y = mx + c$

Cover up - similar to table but used when in the form $ax + by = c$.

e.g. $3x + 2y = 6$. Put $x = 0$. So $2y = 6$ Therefore $y = 3$
Put $y = 0$. So $3x = 6$. Therefore $x = 2$
Gives the coordinates $(0, 3)$ and $(2, 0)$