Graphs - Foundation

What do I need to be able to do?

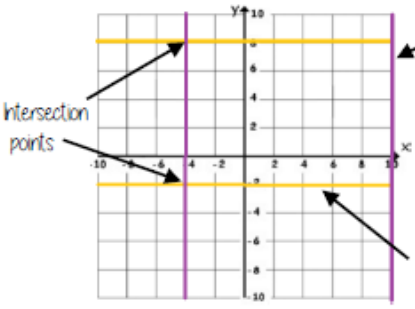
By the end of this unit you should be able to:

- Plot and interpret real life graphs
- Plot linear graphs
- Find the equation of a line from a graph
- Plot quadratic graphs
- Interpret gradient and intercepts of real life graphs

Vocabulary

Travel Graphs: line graphs that are used to describe the motion of objects such as cars, trains, cyclists etc.
Conversion Graph: used to change on unit into another
Linear graph: a straight line graph
y=mx+c: this is the general equation of a straight line, , is the gradient and c is the intercept.
Gradient: the steepness of the slope of a straight line
Intercept: where the graphs crosses the y-axis
Quadratic Graph: a curve called a parabola

Lines parallel to the axes



All the points on this line have a x coordinate of 10

'a' can be ONY positive or negative value including 0

Lines parallel to the **y axis** take the form **x = a** and are **vertical**

Lines parallel to the **x axis** take the form **y = a** and are **horizontal**

All the points on this line have a y coordinate of -2

e.g (3, -2) (7, -2) (-2, -2) all lay on this line because the y coordinate is -2

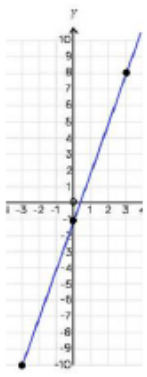
Plotting y = mx + c graphs

$y = 3x - 1$ → 3 x the x coordinate then − 1

x	-3	0	3
y	-10	-1	8

Draw a table to display this information

This represents a coordinate pair (-3, -10)



You only need two points to form a straight line

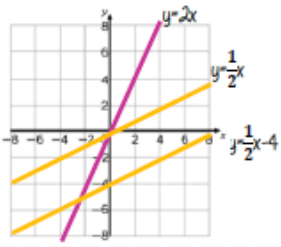
Plotting more points helps you decide if your calculations are correct (if they do make a straight line)

Remember to join the points to make a line

Compare Gradients

$y = mx + c$

The **coefficient** of x (the number in front of x) tells us the gradient of the line



The **greater** the gradient – the **steeper** the line

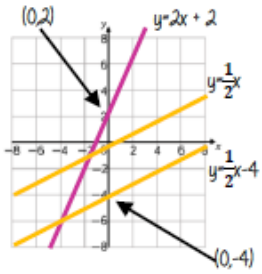
Positive gradients

Negative gradients

Parallel lines have the **same** gradient

Compare Intercepts

$y = mx + c$ ← The value of **c** is the point at which the line crosses the y-axis. **Y intercept**



The coordinate of a y intercept will always be (0,c)

Lines with the **same** y-intercept cross in the **same** place

y = mx + c

The **coefficient** of x (the number in front of x) tells us the gradient of the line

$y = mx + c$ ← The value of **c** is the point at which the line crosses the y-axis. **Y intercept**

y and x are **coordinates**

The equation of a line can be rearranged. Eg

$y = c + mx$

$c = y - mx$

Identify which coefficient you are identifying or comparing

Real life graphs

A plumber charges a £25 callout fee, and then £12.50 for every hour. Complete the table of values to show the cost of hiring the plumber.

Time (h)	0	1	2	3	8
Cost (£)	£25				£125

The y-intercept shows the minimum charge. The gradient represents the price per mile

In real life graphs like this values will always be positive because they measure distances or objects which cannot be negative.

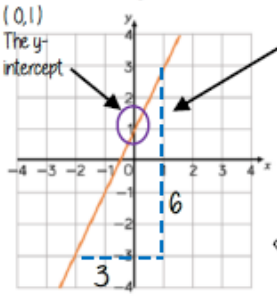
Direct Proportion graphs To represent direct proportion the graph must start at the origin

When you have 0 pens this has 0 cost. The gradient shows the price per pen

A box of pens costs £2.30
Complete the table of values to show the cost of buying boxes of pens.

Boxes	0	1	2	3	8
Cost (£)		£2.30			

Find the equation from a graph



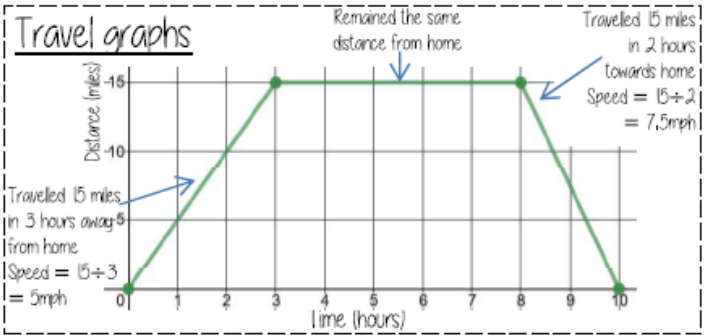
$y = 2x + 1$

The direction of the line indicates a positive gradient

Positive gradients

Negative gradients

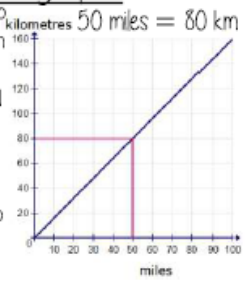
Travel graphs

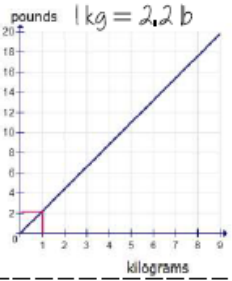


Conversion graphs

Used to change from one unit to another

Use your ruler to draw a line from the value you want converted to the conversion line, then down/across to the unit you want.





Plot quadratic graphs

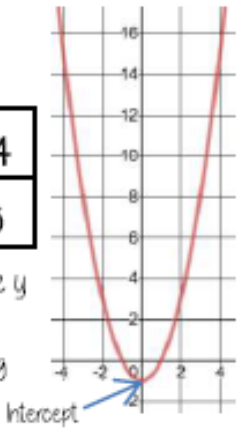
We substitute to find the x values

x^2 gives a happy face ☺ $-x^2$ gives a sad face ☹

$y = x^2 - 1$

x	−4	−2	0	2	4
y	15	3	-1	3	15

You will often see symmetry in the y values in the table as well as the graph (unless you are only working with part of the curve)



$y = -x^2 + 4$

x	−4	−2	0	2	4
y	−12	0	4	0	−12

You may be asked to find the coordinates when y is equal to something e.g when $y = 2$ From the graph we can read that the lines intersect at approximately $(-1.4, 2)$ and $(1.4, 2)$