Algebra 2 – Coordinates and Graphs – Knowledge Organiser

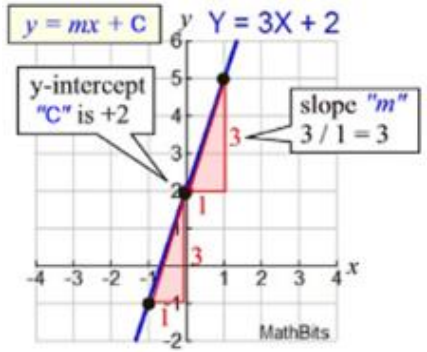
Objective

Be able to work with coordinates

Identify and draw straight line graphs

Plot graphs of functions in real contexts

Interpret graphs of functions in real contexts



Key Facts

Linear/Straight Line Graphs:
The general equation of a linear graph is

$$y = mx + c$$

where m is the gradient and c is the y-intercept.

How to calculate a gradient:

The gradient of a line is how steep it is.

Gradient = $\frac{Change\ in\ y}{Change\ in\ x} = \frac{Rise}{Run}$

The gradient can be positive (line sloping upwards) or negative (sloping downwards)

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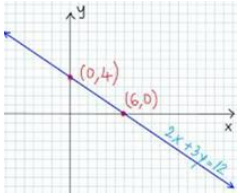
Plotting Linear Graphs:

Method 1: Table of Values
Construct a table of values to calculate coordinates.

x	-3	-2	-1	0	1	2	3
y= x +3	0	1	2	3	4	5	6

Method 2: Gradient-Intercept Method (use when the equation is in the form $y = mx + c$)
1. Plots the y-intercept
2. Using the gradient, plot a second point, then a third point.
3. Draw a line through the three points plotted.
(See picture at top right of this organiser)

Method 3: Cover-Up Method (use when the equation is in the form $ax + by = c$)
1. Cover the x term and solve the resulting equation. Plot this on the x-axis.
2. Cover the y term and solve the resulting equation. Plot this on the y-axis.
3. Draw a line through the two points plotted.



Key Concept Check

- Convince me that y=0 is the x-axis.
- Choose if the statement is Always / Sometimes / Never:- The line x=a is parallel to the x-axis.
- Draw a distance-time graph of your journey to school. Explain the key features.
- Show me a point on the line y = 2x + 1, and another, and another …

Key words used in this unit:

Cartesian Coordinate – The exact position on a graph described by 2 numbers; the 1st number is the distance along, and the 2nd number is the distance up or down.
E.g. (12,5) is 12 units right, and 5 units up.

Origin – The origin is a point where the x-axis and y-axis intersect. It has a coordinate of (0,0).

Gradient – A measure of the slope/steepness of a straight line. It can be positive or negative.

Intercept – The point where a line or curve crosses the y-axis of a graph.

Linear – A linear graph is a straight line graph, which has an equation of degree 1 (the highest power of 1 for any term in the equation).

Quadratic – A quadratic graph is a curve or parabola, which has an equation of degree 2 (the highest power of 2 for any term in the equation).

Function- A function is a special relationship where each input has a single output. Often written as "f(x)" where x is the input value.

Piece-wise linear function -
A function/graph made of a collection of line segments, where each line segment is described by a different function.

Distance-time & Speed-time graphs – A graph with time along the x-axis and distance or speed along the y-axis.