



What do I need to be able to do?

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

- Understand, plot and interpret coordinates in all four quadrants
- Understand coordinates that lie on a straight line, parallel to either the x or the y axis
- Recognise, plot and use basic straight lines
- Identify positive and negative gradients
- Understand gradient as a measure of how steep a sloping line is
- Link linear graphs to number sequences
- Interpret and plot line graphs for equations in the form $y = mx + c$

Keywords

coordinates – a pair of values that show an exact position

horizontal – a perfectly flat line, going from left to right (or vice versa)

vertical – a perfectly straight line going up and down, with no slope; a line at right-angles to the horizontal

x-axis – the line on a graph that runs horizontally through zero (the origin)

y-axis – the line on a graph that runs vertically through zero (the origin)

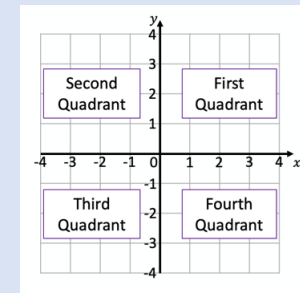
origin – the point (0,0) on a graph; the point at which the two axes cross

quadrant – one of the four quarters of the coordinate plane

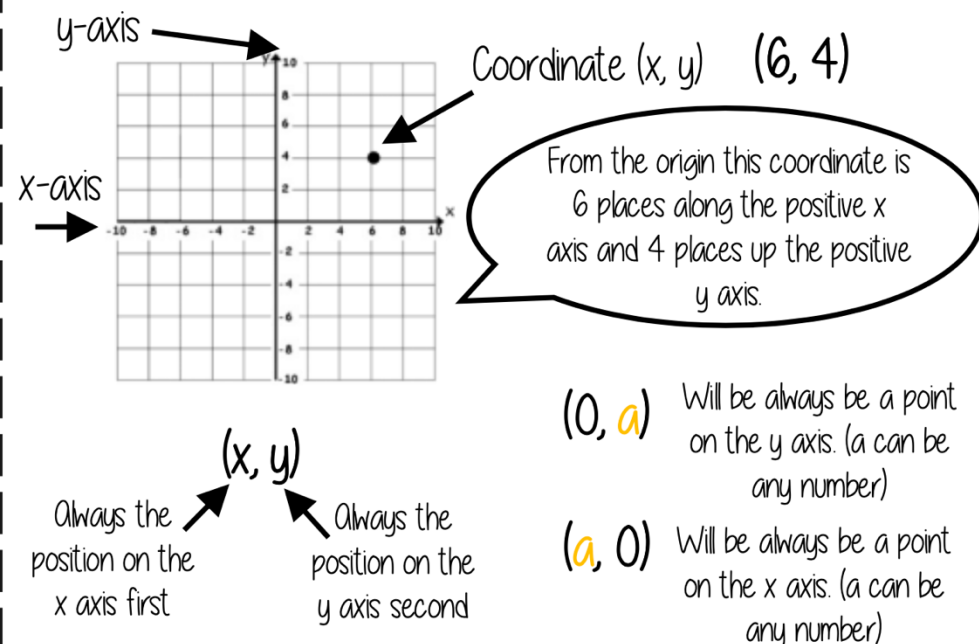
gradient – the steepness of a line

intercept – the point at which one line crosses another

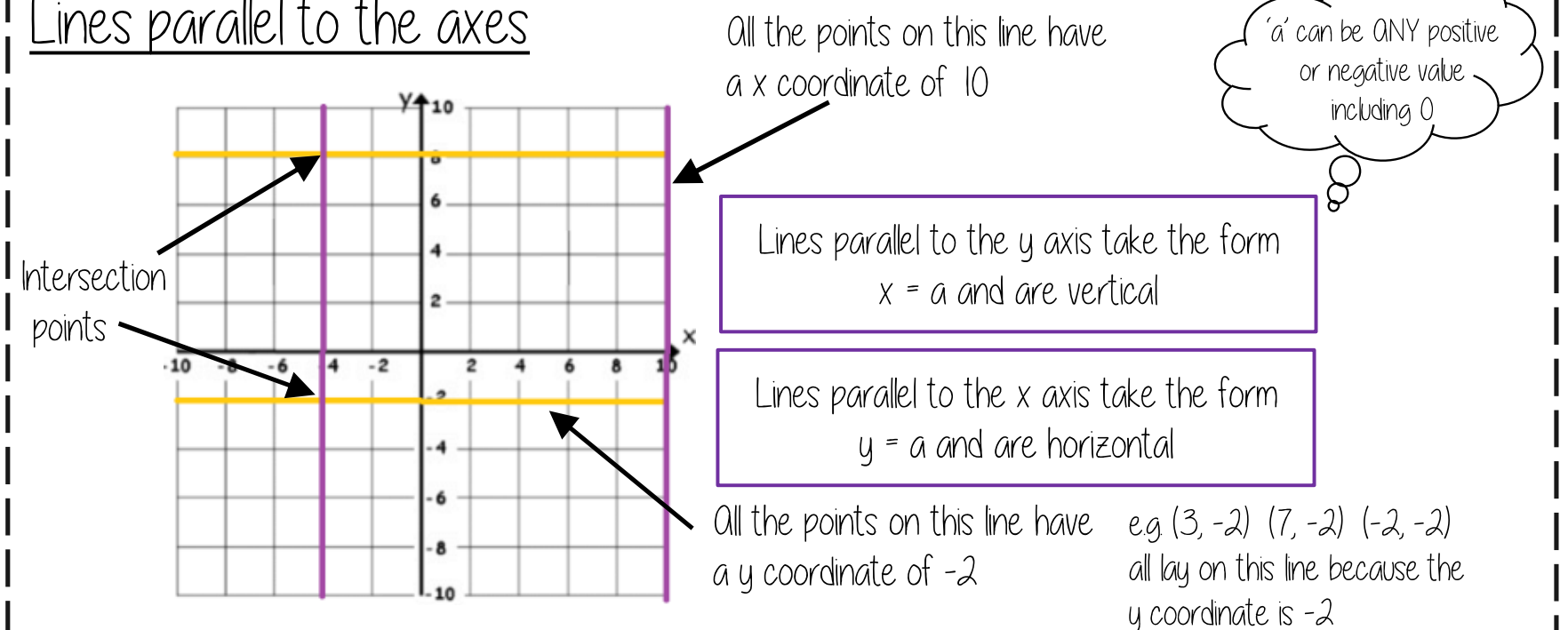
parallel – lines that are side by side and have the same distance continuously between them; straight lines that never meet



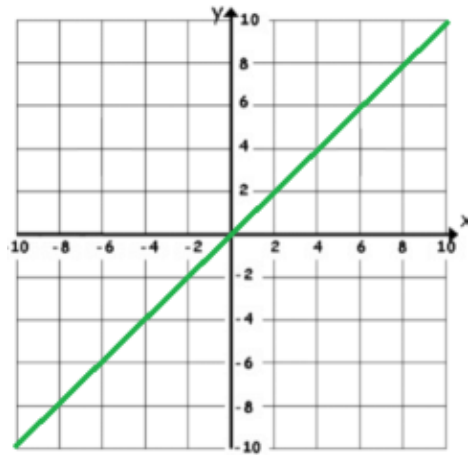
Coordinates in four quadrants



Lines parallel to the axes



Recognise and use the line $y=x$



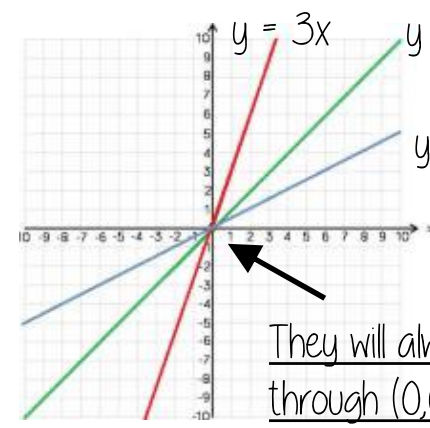
This means the x and the y coordinate have the same value

Examples of coordinates on this line: (0, 0) (-3, -3) (8, 8)

The axes scale is important — if the scale is the same $y = x$ will be a straight line at 45°

Recognise and use the lines $y=kx$

The value of k changes the steepness of the line

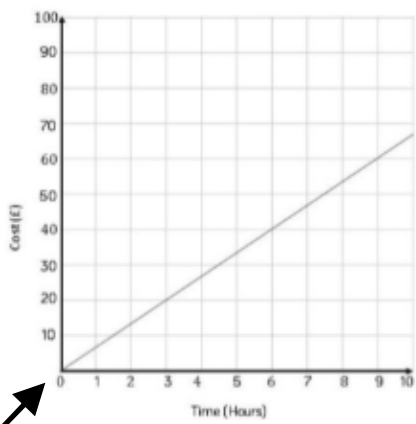


Note: $y = x$ is the same as $y = 1x$

The bigger the value of k the steeper the line will be.

The closer to 0 the value of k the closer the line will be to the x axis.

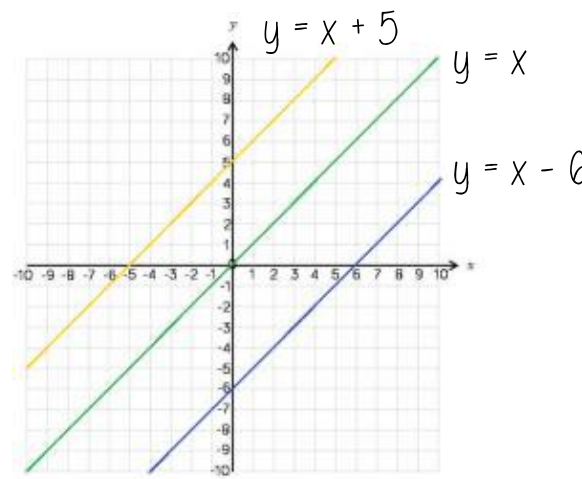
Direct Proportion using $y=kx$



The line must be straight to be directly proportional — variables increase at the same rate k

Direct proportion graphs always start at (0,0) as they are describing relationships between two variables

Lines in the form $y = x + a$



All the lines are parallel because the gradients are the same

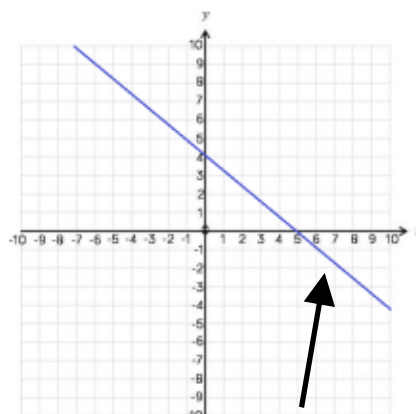
$y = x + a$

This is the line $y=x$ when the y and x coordinate are the same

This shows the translation of that line. e.g. $y = x + 5$ is the line $y=x$ moved 5 places up the graph

5 has been added to each of the x coordinates

Lines with negative gradients



Any straight-line graph with a negative x value has a negative gradient.

Eg $y = -2x$
 $y = -x$ $y + x = 12$

Direction of all negative gradients

Plotting $y = mx + c$ graphs

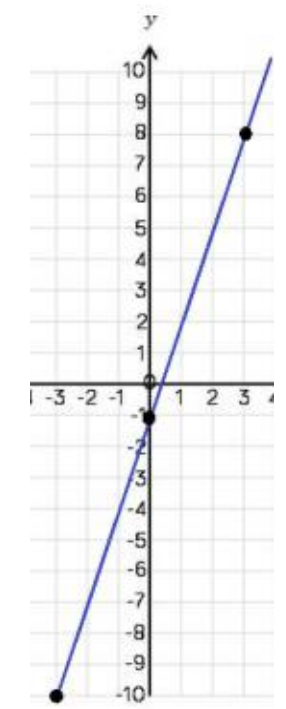
$y = 3x - 1$

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