

## STRAIGHT LINE GRAPHS

### Plotting straight lines graphs given an equation (there are 3 choices)

A) Rearrange into the form  $y = mx + c$

Plot a table, eg:

x	-3	-2	-1	0	1	2	3
$y = 2x - 4$	-10	-8	-6	-4	-2	0	2

Draw the line through the points.

B) Rearrange into the form  $y = mx + c$

Identify the values of m and c

Plot a point at (0,c) to start with.

Plot further points remembering that 1 unit to the right equates to m units up

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Sometimes the gradient is an awkward value like  $-3/5$ .

By definition this gradient means:

1 RIGHT,  $-3/5$  UP  
1 RIGHT,  $3/5$  DOWN (lose the -)  
5 RIGHT, 3 DOWN (\* by 5)

We can now plot points by moving 5 right and 3 down each time

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Draw the line through the points.

C) Use the 0,0 method.

Substitute 0 for x into your equation, solve the equation to find the corresponding value of y.

Plot the point (0, y)

Substitute 0 for y into your equation, solve the equation to find the corresponding value of x

Plot the point (x, 0)

Draw the line through these two points.

### Determining the equation of a line given its gradient and its y-intercept.

Let  $m$  equal the gradient and  $c$  equal the y-intercept, then the equation is simply  $y = mx + c$

### Determining the equation of a line given a graph [The graph shows the y-intercept only]

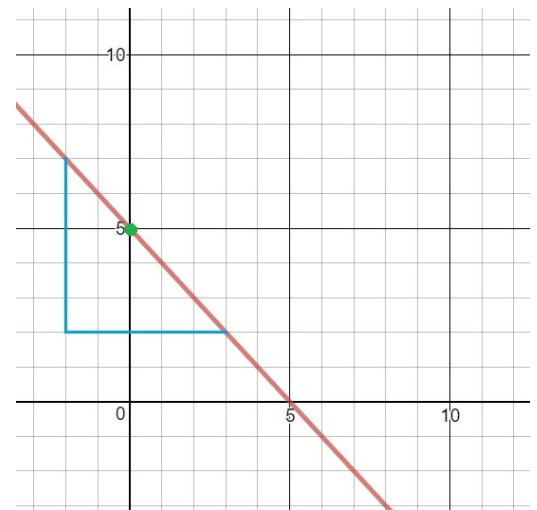
Identify on the graph the value (y-intercept) of where the line crosses the y axis, hence  $c = 5$ .

Draw a triangle on the line (preferably though points with integer coordinates).

The vertical length is 5  
The horizontal length is 5

Therefore the gradient is  $m = -5/5 = -1$   
[A minus sign must be included if the line goes downwards]

The equation is then  $y = -1x + 5$   
We would write this as  $y = -x + 5$   
Or even as  $y = 5 - x$



### Determining the equation of a line given a graph [The graph shows a point (A,B) on the line]

Firstly determine  $m$  by drawing a triangle as shown above.

$m = 9/3 = 3$  and the point on the line is  $(3, 10)$

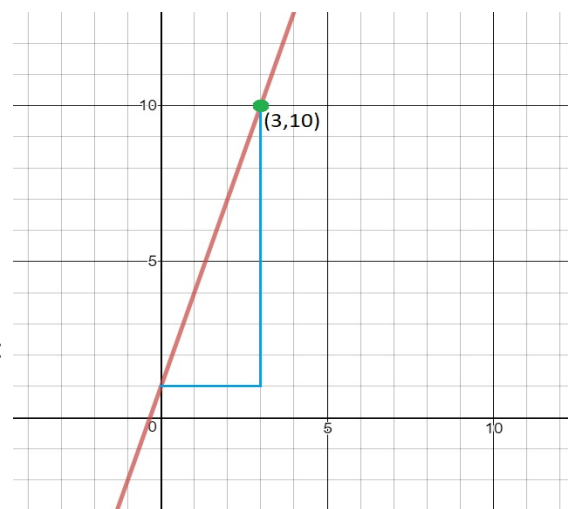
The equation of the line is:  $y = 3x + c$   
[ $c$  is unknown, and we must calculate it]

The point  $(3, 10)$  lies on the line,  
so it must satisfy the equation of the line.  
Therefore we can substitute this into the equation  $y = 3x + c$ :

$$10 = 3 * 3 + c$$

Solving this equation yields  $c = 1$ .

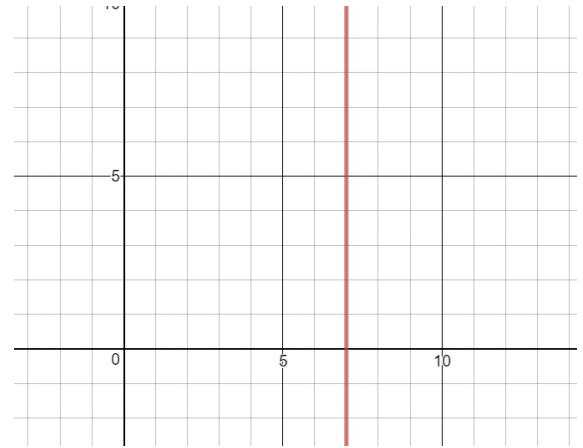
Hence the equation of the line is  $y = 3x + 1$



## Special straight line graphs

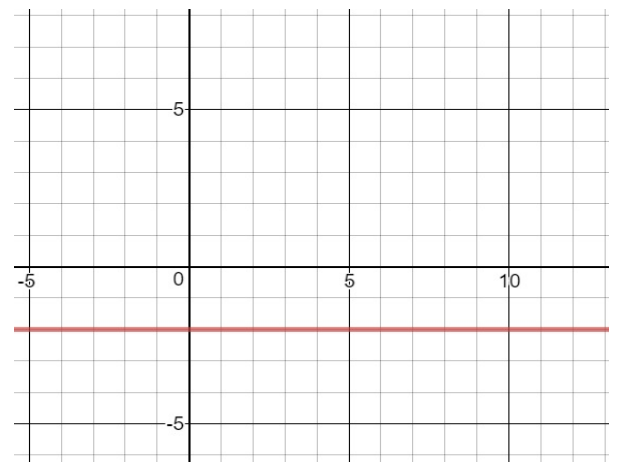
An equation of the form  $x = k$  is just the vertical line passing through the point  $(k, 0)$

Eg, the graph of  $x = 7$  is shown:

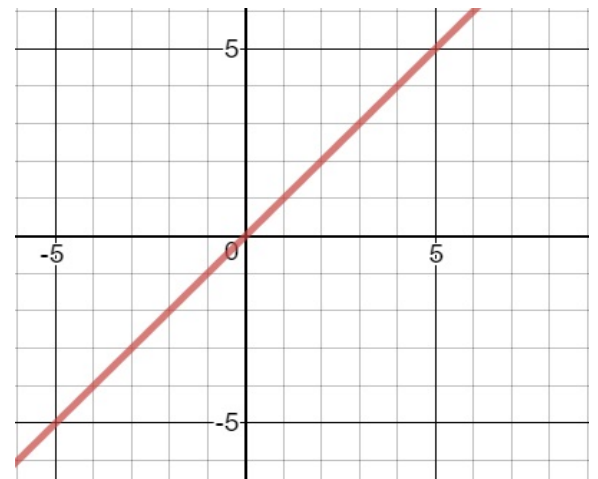


An equation of the form  $y = k$  is just the horizontal line passing through the point  $(0, k)$

Eg, the graph of  $y = -2$  is shown:



This is the very common graph of  $y = x$



This is the graph of  $y = -x$

