

# Graphs 5: Plotting from a formula

- You need to know how to substitute into a formula
- You need to know the rules for negative numbers

Suppose you had to plot the graph of  $y = 3x + 2$ .

Set up a table like this...

X	0	1	2	3
Y				

Substitute  $X = 0$  into the formula,  $Y = 3 \times 0 + 2 = 0 + 2$ , so put 2 in the first empty Y box

Substitute  $X = 1$  into the formula,  $Y = 3 \times 1 + 2 = 3 + 2 = 5$ , so put  $Y = 5$  in the next column

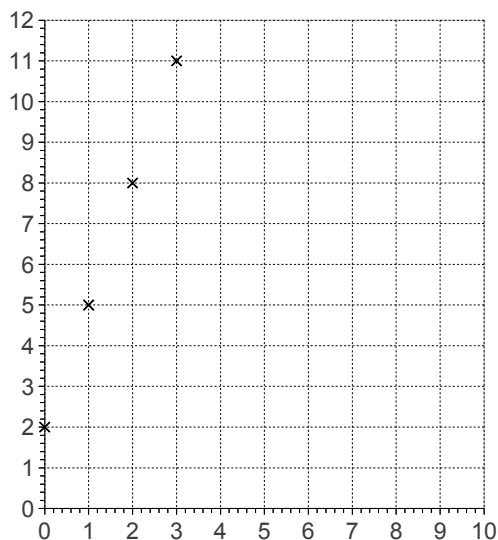
Substitute  $X = 2$  into the formula,  $Y = 3 \times 2 + 2 = 6 + 2 = 8$ , so put  $Y = 8$  in the next column

Substitute  $X = 3$  into the formula,  $Y = 3 \times 3 + 2 = 9 + 2 = 11$ , so put  $Y = 11$  in the last column

The table looks like this...

X	0	1	2	3
Y	2	5	8	11

Then you plot the points and draw a straight line through them...



## You try plotting these formulas...

Use squared paper, use 2 squares to 1 unit (so each unit is 1cm)

- 1) Plot  $y = x + 3$  on scales that start at (0,0) and reach to (10,10)  
Make a table with  $X = 0, X = 1, X = 2$  and so on up to  $X = 5$
- 2) Plot  $y = -3x + 9$  on scales that run from  $-10$  to  $+12$  through zero for Y axis and  $-5$  through to  $+5$  for X.  
Use this table...

X	-2	-1	0	+1	+2	+3	+4	+5
Y								

- 3) Make up your own axes and plot the graph of  $y = 2x + 5$  taking  $x$  from  $-3$  to  $+3$
- 4) Plot  $10 - 2x$  from  $x = 0$  to  $x = 5$
- 5) Plot  $y = \frac{1}{2}x - 2$  taking  $x$  from 0 to 10

## Explaining questions

Suppose you have these four formulas for graphs...

- a)  $y = 3x - 2$       b)  $y = 10 - 2x$       c)  $y = 2x + 6$       d)  $y = 2x - 4$

Answer these questions about the formulas

- 1) Which formula will give the **steepest** graph? How do you know?
- 2) Which two formulas will produce lines that are **parallel** to each other? Why?
- 3) Which formula will give a line with a **negative** gradient and a **positive** intercept?  
Explain your answer
- 4) Which formula will give a line that has the **smallest** intercept? How do you know its the smallest?
- 5) Hermione thinks that the lines for formulas b) and c) will cross at the point (1, 8).  
Is she right? Show a calculation...