

Sketching Quadratic Graphs

For example...

sketch the graph of $y = 5x^2 - 6x - 8$

Step 1 Factorise the equation. This will give you the x-intercepts (where the line crosses on the x-axis when $y = 0$)

When $y = 0$...

$$0 = 5x^2 - 6x - 8$$

$$(5x + 4)(x - 2) = 0$$

$$5x = -4$$

$$x = -0.8 \text{ or } x = 2$$

So the 2 intercepts are $(-0.8, 0)$ and $(2, 0)$

Step 2 Now you want to find the x co-ordinate of the turning point. This will be halfway between the 2 x-intercepts

You can work this out by adding the 2 x co-ordinates and dividing them by 2

$$-0.8 + 2 = 1.2 \div 2 = 0.6$$

So the turning point is 0.6 on the x axis.

Step 3 To get the y co-ordinate of the turning point, go back to the original equation and stick in the answer for x.

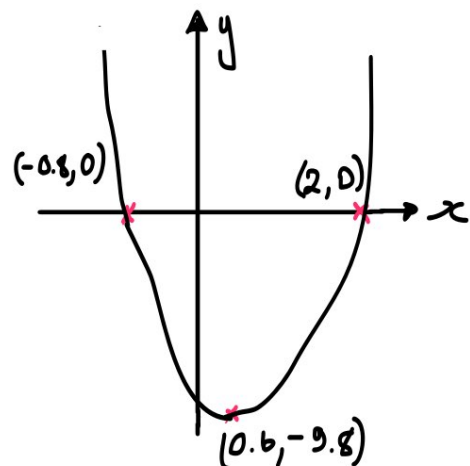
$$y = 5x^2 - 6x - 8$$

$$y = 5(0.6)^2 - 6 \times 0.6 - 8$$

$$y = -9.8$$

So the turning point co-ordinates are $(0.6, -9.8)$

Hopefully you can draw a better graph than this!



Now try some yourself...

1.

For each of the following equations, find the co-ordinates of i/ the x-intercepts, ii/ the turning point

a. $y = (x - 1)(x + 2)$

b. $y = (x + 1)(x + 7)$

c. $y = (x + 10)(x + 6)$

2.

Sketch the graphs of these equations. Label the turning points and x-intercepts with their co-ordinates (like my rubbish graph on the other side).

a. $y = x^2 - 4$

b. $y = x^2 - 4x - 12$

c. $y = x^2 + 12x + 32$

d. $y = x^2 + x - 20$

e. $y = -x^2 - 2x + 3$

Answers (I'm not drawing them...)

1.

a. i. (-1,0) and (1,0) !! (0,-1)

b. i. (-7,0) and (-1,0) !! (-4,-9)

c. i. (-10,0) and (-6,0) !! (-8,-4)

2. Laid out as above

a. i. (-2,0) and (2,0) !! (0,-4)

b. i. (-2,0) and (6,0) !! (2,-16)

c. i. (-8,0) and (-4,0) !! (-6,-4)

d. i. (-5,0) and (4,0) !! (-0.5,-20.25)

e. i. (-3,0) and (1,0) !! (-1,4)