26th April **Higher Plus 5-a-day**

Corbettmaths

Show the equation $3x^3 + 7x = 5$ has a solution between 0 and 1

$f(x) = 3x^3 + 7x - 5$

$f(0) = -5$

$f(1) = 5$

As there is a change of sign, there is a solution between 0 & 1.

Show that $3x^3 + 7x = 5$ can be rearranged to give

$$x = \frac{5}{7} - \frac{3x^3}{7}$$

$7x = 5 - 3x^3$

$x = \frac{5}{7} - \frac{3x^3}{7}$

Starting with $x_0 = 0$ use the iteration formula

$$x_{n+1} = \frac{5}{7} - \frac{3x_n^3}{7}$$

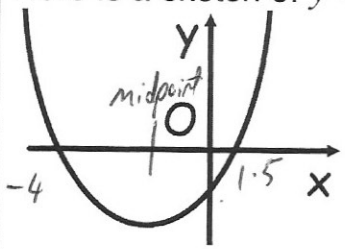
three times to find an estimate for the solution to $3x^3 + 7x = 5$

$x_1 = 0.714285...$

$x_2 = 0.5581...$

$x_3 = 0.639784881...$

Here is a sketch of $y = 2x^2 + 5x - 12$



Find the equation of the line of symmetry of the graph.

$(2x - 3)(x + 4)$

$x = 1.5$ $x = -4$

$\frac{-4 + 1.5}{2} = -1.25$ $x = -1.25$

The ratio of A to B is 1:400 where 400 is given to the nearest 100.

B is 5×10^{15} correct to one significant figure

Calculate the minimum value of A

Give your answer in standard form.

$\text{Min } A = \frac{4.5 \times 10^{15}}{450}$

$\text{Min } A = 1 \times 10^{13}$