Name: _____ 5-a-day Further Maths

18th November

Corbettmaths

Solve $5x^2 + 2x - 8 = 0$ using completing the square

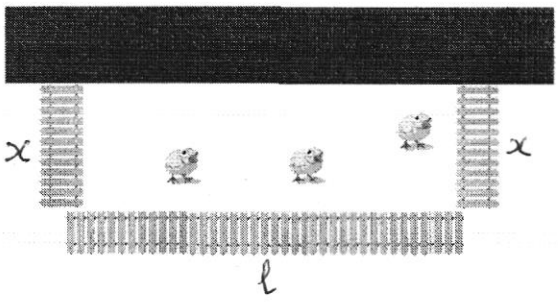
$x^2 + \frac{2}{5}x - \frac{8}{5} = 0$

$(x + \frac{1}{5})^2 - \frac{1}{25} - \frac{8}{5} = 0$

$(x + \frac{1}{5})^2 = \frac{41}{25}$

$x + \frac{1}{5} = \pm\frac{\sqrt{41}}{5} \Rightarrow x = \frac{-1 \pm \sqrt{41}}{5}$

(1·08, −1·48)



Rachel makes a rectangular pen for her chickens.
One side of the pen is a brick wall and the other three sides are made using 50 metres of wooden fencing.

The width of the pen is x metres.

Show the area is given by

$A = 50x - 2x^2$

$l + 2x = 50 \Rightarrow l = 50 - 2x$

$A = lx = x(50 - 2x)$

$= 50x - 2x^2$

Using differentiation, find the maximum value of A.

$\frac{dA}{dx} = 50 - 4x = 0$ at max

$50 = 4x$

$x = \frac{25}{2}$

$\Rightarrow A = 312\frac{1}{2}\ m^2$

Solve

$2cos^2\theta - cos\theta = 1 + sin^2\theta$

for $0° \leq x \leq 360°$

$2\cos^2\theta - \cos\theta = 1 + 1 - \cos^2\theta$

$3\cos^2\theta - \cos\theta - 2 = 0$

$(3\cos\theta + 2)(\cos\theta - 1) = 0$

$\cos\theta = -\frac{2}{3}, 1$

$\theta = 0°, 131.8°, 228.2°, 360°$