

3rd November

Corbettmaths

Expand and simplify fully

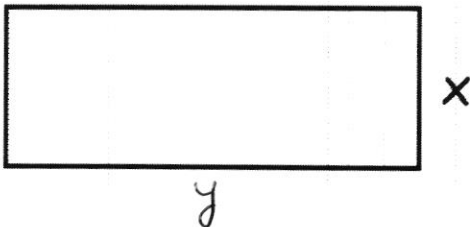
$$(x - 9)(x - 3)(x - 2)$$

$$\begin{aligned} &= (x-9)(x^2 - 5x + 6) \\ &= x^3 - 5x^2 + 6x - 9x^2 + 45x - 54 \\ &= \underline{x^3 - 14x^2 + 51x - 54} \end{aligned}$$

Solve $3\cos\theta = 1$ for $0^\circ \leq \theta \leq 360^\circ$

$$\begin{aligned} \cos\theta &= \frac{1}{3} \\ \Rightarrow \theta &= \underline{70.5^\circ, 289.5^\circ} \end{aligned}$$

A farmer creates a rectangular pen for his chickens.



The width of the field is x metres.

The perimeter of the field is 120 metres.

Show that the length of the rectangle is $60 - x$ metres

$$\begin{aligned} x + y &= \frac{120}{2} \Rightarrow x + y = 60 \\ &\Rightarrow \underline{y = 60 - x} \end{aligned}$$

Show that the area of the field is $A = 60x - x^2$

$$\begin{aligned} A &= xy = x(60 - x) \\ &= \underline{60x - x^2} \end{aligned}$$

Use differentiation to find the value of x for which A is a maximum

$$\begin{aligned} \frac{dA}{dx} &= 60 - 2x \\ \text{At max } 60 - 2x &= 0 \\ &\Rightarrow \underline{x = 30\text{m}} \end{aligned}$$