

16th March



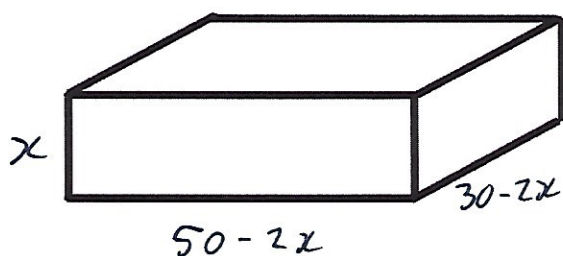
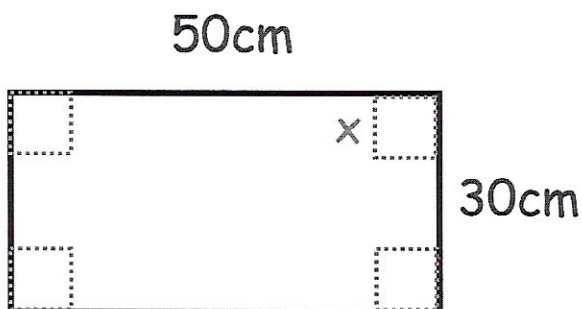
Corbettmaths

Factorise  $15x^2 + 32x + 16$ 

$$(5x + 4)(3x + 4)$$

A rectangular sheet of card measures 50cm by 30cm.

Four squares of side length  $x$  cm are cut from each corner and the remaining card is folded to make a tray.



Show that the volume of the tray is

$$V = 1500x - 160x^2 + 4x^3$$

$$\begin{aligned} V &= x(30-2x)(50-2x) \\ &= x(1500 - 160x + 4x^2) \\ &= 1500x - 160x^2 + 4x^3 \end{aligned}$$

QED

Find the value of  $x$  for which  $V$  is a maximum.

$$\frac{dV}{dx} = 1500 - 320x + 12x^2$$

$$\text{Max } 12x^2 - 320x + 1500 = 0$$

$$x = \frac{320 \pm \sqrt{30400}}{24}$$

$$x = 20.6 \text{ or } x = 6.07$$

$\downarrow x$   
 $30-2x$

$$x = 6.07 \text{ cm}$$

Find the maximum value of  $V$

$$\begin{aligned} V &= 6.07 \times (30 - 2 \times 6.07) (50 - 2 \times 6.07) \\ &= 4104.41 \text{ cm}^3 \end{aligned}$$