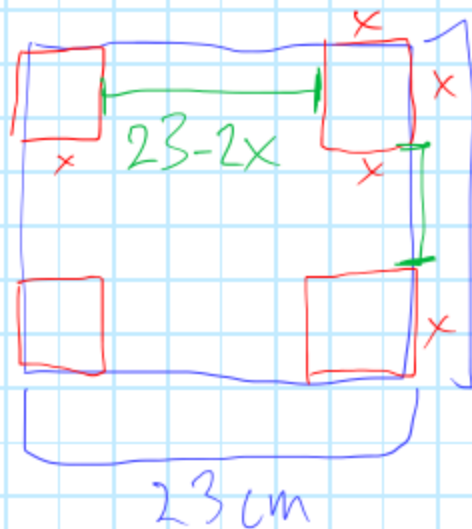<u>Warm-up</u>
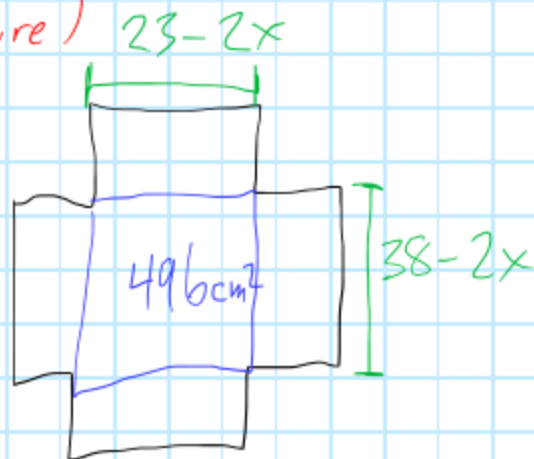
A rectangular piece of cardboard 23cm × 38cm
is made into a lidless box by cutting 4
identical squares from the corners. If the area
of the base of the box is 496 cm², find:

a) the dimensions of the box.

b) the volume of the box.

(Hint: draw a picture)

$$496 = (23-2x)(38-2x)$$

$$496 = 874 - 76x - 46x + 4x^2$$

$$0 = 4x^2 - 122x + 378$$

Quad form

$a = 4$
$b = -122$
$c = 378$

$$x = \frac{-(-122) \pm \sqrt{(-122)^2 - 4(4)(378)}}{2(4)}$$

$$x = \frac{122 \pm \sqrt{14884 - 6048}}{8}$$

$$x = \frac{122 \pm \sqrt{8836}}{8} = \frac{122 \pm 94}{8}$$

$$= 27, \ 3.5$$

a) Dimensions: $W \times l \times h$

$x = 27$

$23 - 2(27) \times 38 - 2(27) \times (27)$

$-31 \ cm \times -16 cm \times 27 cm$

↑ neg

$x = 3.5$

$23 - 2(3.5) \times 38 - 2(3.5) \times 3.5$

$\boxed{16 \ cm \times 31 cm \times 3.5 \ cm}$

b) Volume $= (16)(31)(3.5) = \boxed{1736 \ cm^3}$