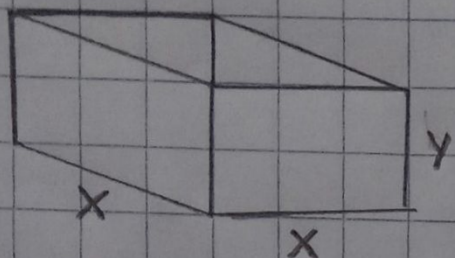


Karla Mariela Palox Tuy 2290-24-14588

### Parcial Corto - Semana 17

7. Si se cuenta con  $1200 \text{ cm}^2$  de material para hacer una caja con base cuadrada y la parte superior abierta, encuentre el Volumen máximo posible de la caja.



$$V(x, y) = x^2 y$$

Area = Area lateral + area de la base

$$A = 4xy + x^2 = 1200$$

$$4xy + x^2 = 1200$$

$$4xy = 1200 - x^2$$

$$y = \frac{1200 - x^2}{4x}$$

$$V(x, y) = x^2 y$$

$$V(x) = x^2 \left( \frac{1200 - x^2}{4x} \right)$$

$$= \frac{1}{4} (1200x - x^3)$$

$$V(x) = 300x - \frac{1}{4}x^3$$



Maximisar

$$V(x) = 300x - \frac{1}{4}x^3$$

$$V'(x) = 300 - \frac{3}{4}x^2$$

$$V'(x) = 0$$

$$300 - \frac{3}{4}x^2 = 0$$

$$300 = \frac{3}{4}x^2 = 100 = \frac{1}{4}x^2 =$$

$$= 400 = x^2$$

$$= 20 = x$$

$$V''(x) = 300 - \frac{3}{4}x^2 = -\frac{3}{2}x$$

$$V''(20) = -\frac{3}{2}(20) = -30 < 0 \quad x = 20$$

$$V(20) = 300(20) - \frac{1}{4}(20)^3 = 6000 - \frac{1}{4} \times 8000 = 4000$$

El Volumen maximo es 4000 cm<sup>3</sup> //