







How find  
maximum of a function?

$$f(x)$$

$$f'(x) = 0 \text{ find critical \#}$$

$$f''(x)$$

$$f''(cn) > 0 \rightarrow \text{minimum}$$

$$f''(cn) < 0 \rightarrow \text{maximum}$$

$$f''(cn) = 0 \text{ inflection}$$



$$108 \text{ in}^2 = SA$$

$$x^2 + 4hx = 108$$

$$4hx = 108 - x^2$$

$$h = \frac{108 - x^2}{4x}$$

$$V = hx^2$$

$$V = \left( \frac{108 - x^2}{4x} \right) x^2$$

$$V = \left( \frac{108}{4} - \frac{x^2}{4} \right) x$$

$$V = \frac{108x}{4} - \frac{x^3}{4}$$

$$\frac{dV}{dx} = \frac{108}{4} - \frac{3x^2}{4}$$

$$0 = 27 - \frac{3}{4}x^2$$

$$-27 = -\frac{3}{4}x^2$$

$$x^2 = 36$$

$$x = \pm 6$$

neg does not make sense

$$\frac{d^2V}{dx^2} = -\frac{3}{2}x = -\frac{3}{2}x$$

neg  $\Rightarrow$  max!!

$$x = 6 \text{ in} \quad h = \frac{108 - x^2}{4x}$$

$$h = \frac{108 - 36}{24} = 3 \text{ in}$$

$$V = x^2 \cdot h = 36 \cdot 3 = 108 \text{ in}^3$$