

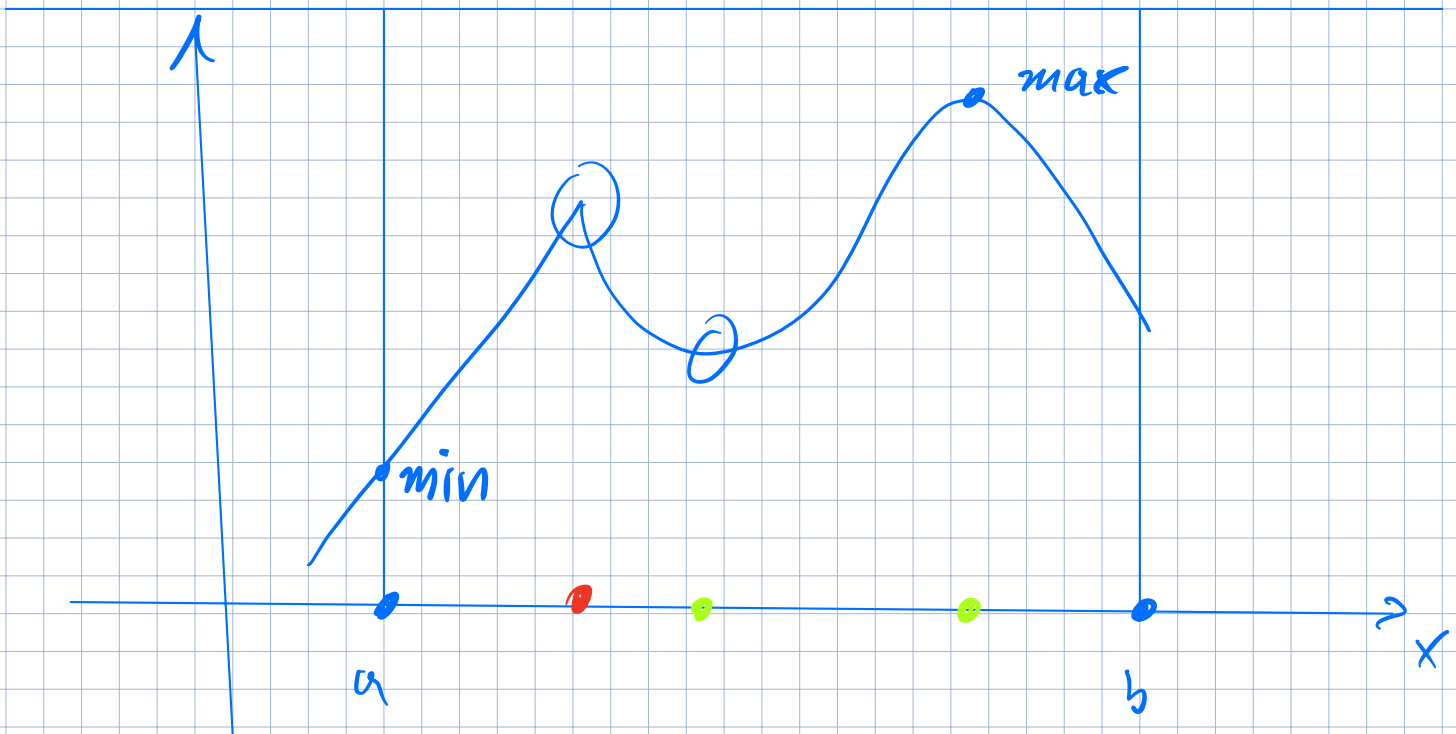
Review

4/23/24

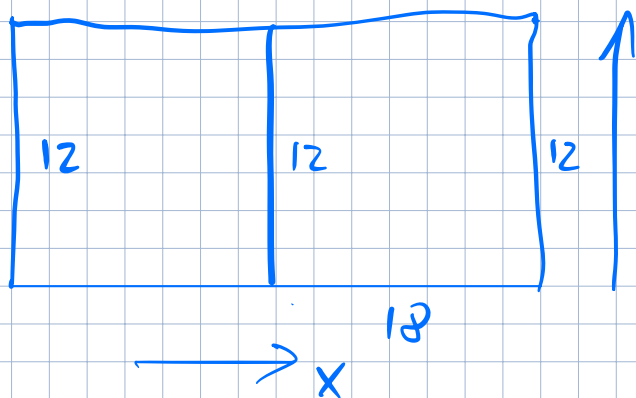
Th.: 10:30am LCB 215

Fr.: 10:30am LCB 215

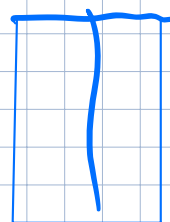
Mo 4/29 10:30 - 12:30 Final Exam, HERE



72 ft fence



$$A = 12 \cdot 18 = 216$$



$$f(x) = xy = \min$$

$$y = y(x)$$

$$3y + 2x = 72$$

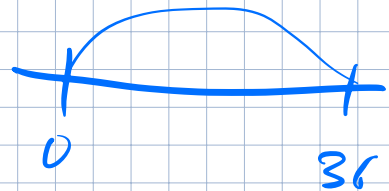
$$0 \leq x \leq 36$$

$$3y = 72 - 2x$$

$$y = \frac{72 - 2x}{3}$$

$$f(x) = \frac{1}{3}x(72 - 2x)$$

$$= \frac{1}{3}(72x - 2x^2)$$



$$f'(x) = \frac{1}{3}(72 - 4x) = 0$$

$$x = 18 \text{ ft}$$

$$\frac{72}{4} = 18$$

$$y = \frac{72 - 36}{3} = 12$$

paint to paint 120 ft^2

x sphere and cube s

$$V = \min$$

$$V = \frac{4\pi r^3}{3} + s^3 = \min$$

$$A = 120 \text{ ft}^2 = 4\pi r^2 + 6s^2 = 120$$

$$4\pi r^2 = 120 - 6s^2$$

$$r^2 = \frac{120 - 6s^2}{4\pi}$$

$$= \frac{60 - 3s^2}{2\pi}$$

$$r = \left(\frac{60 - 3s^2}{2\pi} \right)^{1/2}$$

$$V = \frac{4\pi}{3} \left(\frac{60 - 3s^2}{2\pi} \right)^{3/2} + s^3$$

$$V' = \frac{4\pi}{3} \cdot \frac{3}{2} \left(\frac{60 - 3s^2}{2\pi} \right)^{1/2} \left(-\frac{6s}{2\pi} \right) + 3s^2 = 0$$

Rel. Rates



$$A' = ? \quad \text{when } A = 12 \text{ ft}^2$$

$$h' = v$$

$$A = \frac{1}{2} b h = 12$$

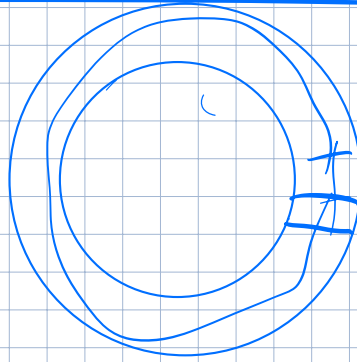
$$h = \frac{24}{b}$$

true
but
irrelevant

$$A' = \frac{1}{2} b h' = \frac{1}{2} b v$$

$$A = \pi r^2$$

$$A' = c$$



$$r' \text{ when } A = 1 \quad \pi r^2 = 1 \quad r = \sqrt{\frac{1}{\pi}}$$

$$A' = c = 2\pi r r'$$

$$r' = \frac{c}{2\pi r} = \frac{A'}{2\pi r}$$

$$\int \sqrt{u} = \int u^{1/2} = \frac{2}{3} u^{3/2}$$

$$\int_1^2 x \sqrt{1+x^2} dx = \frac{1}{2} \int_2^5 \sqrt{u} du$$
$$= \left[\frac{1}{2} \cdot \frac{2}{3} u^{3/2} \right]_2^5 = \frac{1}{3} \left(5^{3/2} - 2^{3/2} \right)$$

$$u = 1+x^2$$

$$du = 2x dx$$

$$x dx = \frac{1}{2} du$$