

HW 22 #11

$$a(t) = 2t + 1$$

$$s(0) = 3$$

$$v(0) = -2$$

$$s(t) = \frac{1}{3}t^3 + \frac{1}{2}t^2 - 2t + 3$$

$$a(t) = 2t + 1$$

$$v(t) = t^2 + t + C$$

$$-2 = \cancel{(0)^2} + \cancel{(0)} + C$$

$$-2 = C$$

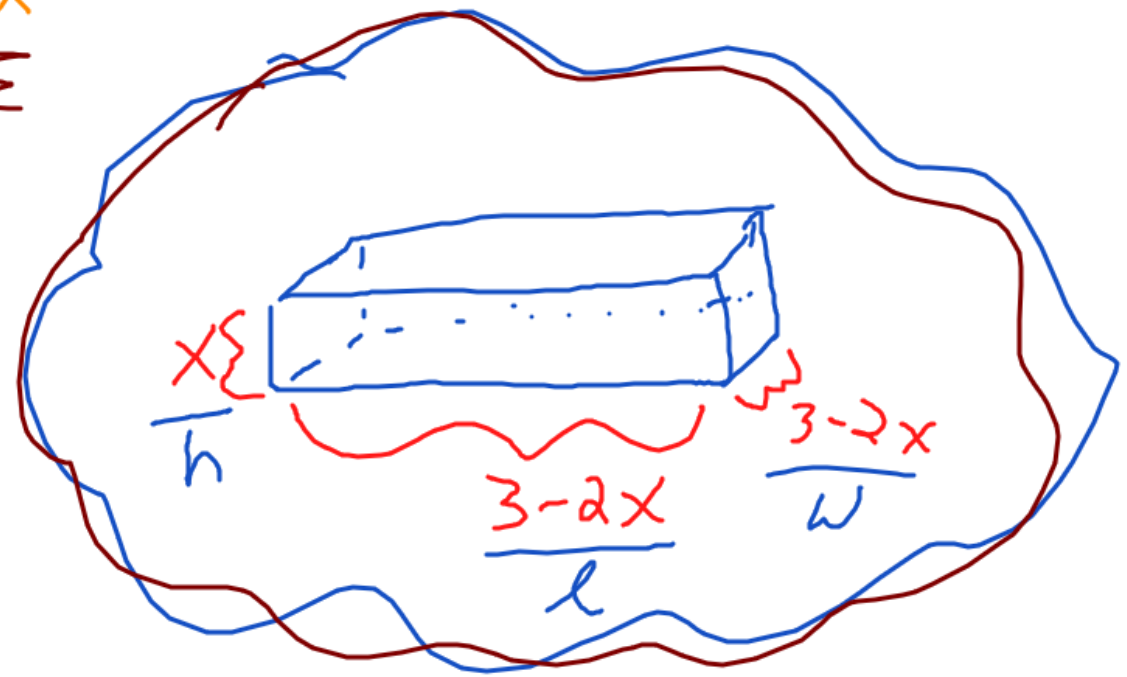
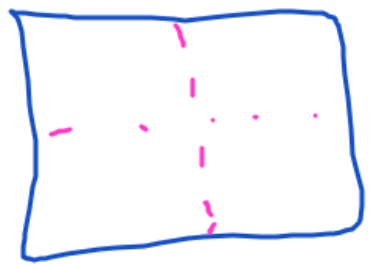
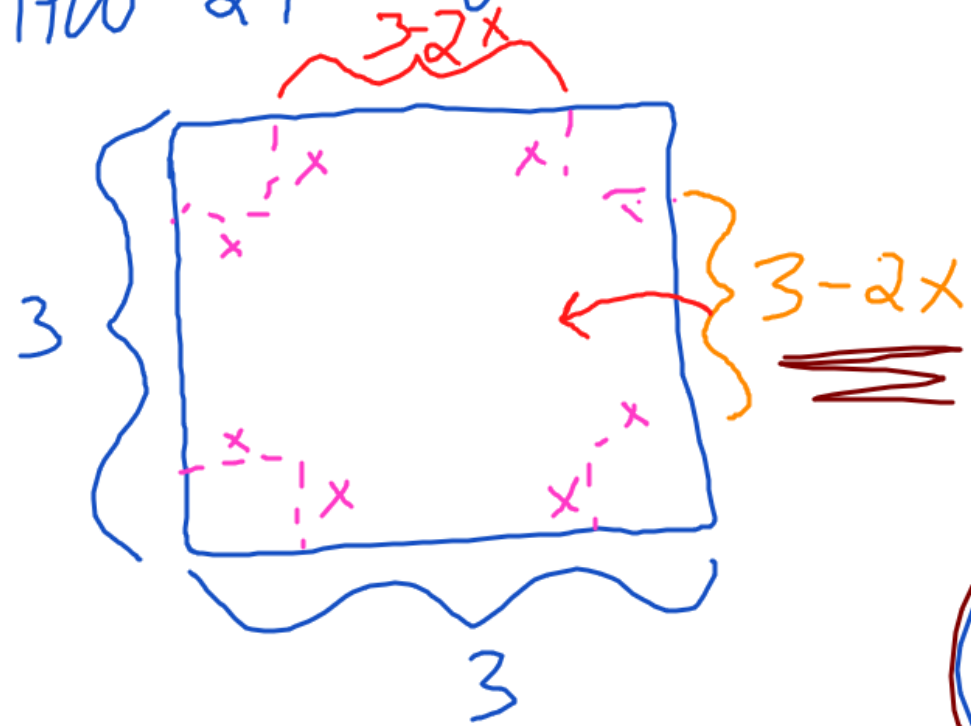
$$v(t) = t^2 + t - 2$$

$$s(t) = \frac{1}{3}t^3 + \frac{1}{2}t^2 - 2t + C$$

$$3 = \frac{1}{3}\cancel{(0)^3} + \frac{1}{2}\cancel{(0)^2} - 2\cancel{(0)} + C$$

$$C = 3$$

HW 21 #8



$$V = lwh$$

$$V = (3-2x)^2 x$$

$$= (9-12x+4x^2) x$$

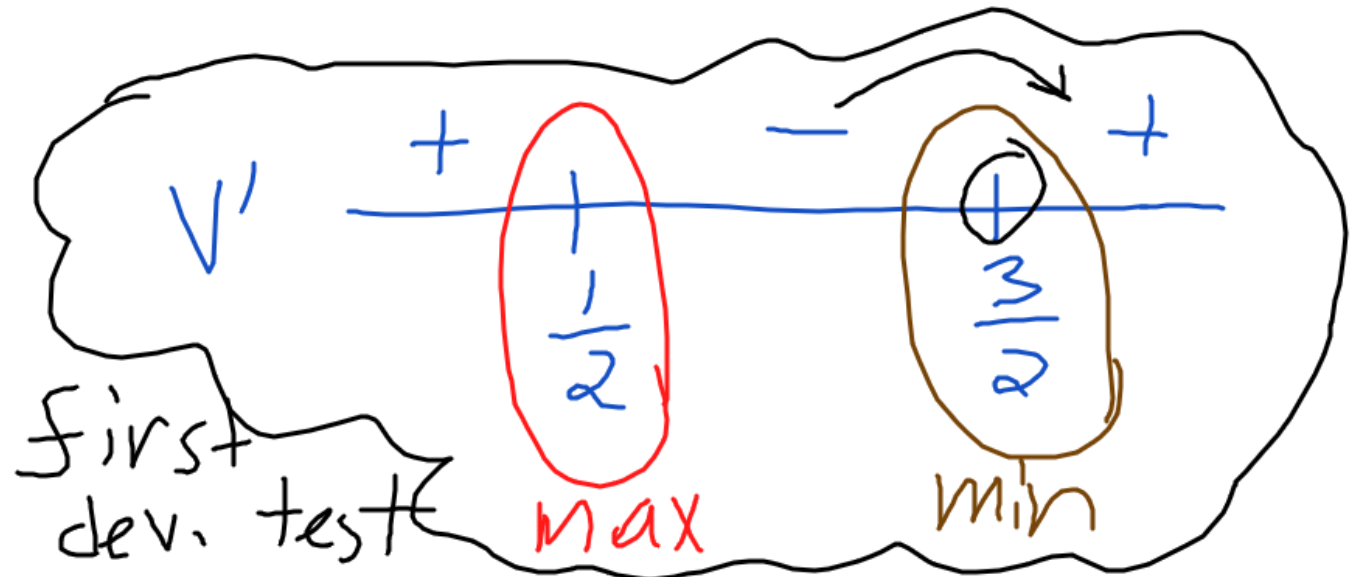
$$= 9x-12x^2+4x^3$$

$$V' = 9-24x+12x^2$$

$$= 3(4x^2-8x+3)$$

$$0 = 3(2x-1)(2x-3)$$

$$x = \frac{1}{2}, x = \frac{3}{2}$$



max vol @ $x = \frac{1}{2}$

$$V_{\max} = (3-1)^2 \left(\frac{1}{2}\right)$$

$$= 4\left(\frac{1}{2}\right) = \boxed{2}$$

$$V_{\min} \text{ @ } x = \frac{3}{2}$$

$$V = 0$$

$$V' = 9 - 24x + 12x^2$$

$$V'' = -24 + 24x$$

$$= 24x - 24$$

$$= 24(x - 1)$$

2nd der. test

$$\underline{x = \frac{1}{2}}, x = \frac{3}{2}$$

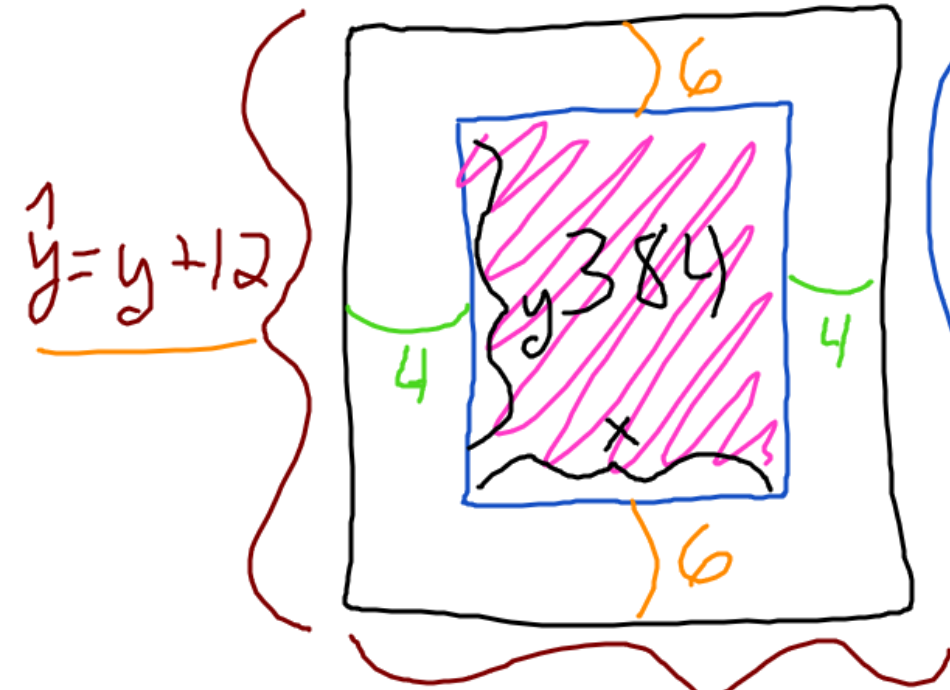
$$\left[V''\left(\frac{1}{2}\right) = 24\left(\frac{1}{2} - 1\right) = -12 < 0 \right]$$

 max

$$\left[V''\left(\frac{3}{2}\right) = 24\left(\frac{3}{2} - 1\right) = 12 > 0 \right]$$

 min

HW 21 #7



$$[xy = 384]$$

$$\text{min: } \hat{x} \hat{y}$$

$$= (y + 12)(x + 8)$$

$$y = \frac{384}{x}$$

$$A = \left(\frac{384}{x} + 12 \right) (x + 8) \text{ min.}$$

$$x = 16 \quad y = 24$$

$$\hat{x} = 16 + 8 = 24$$

$$\hat{y} = 24 + 12 = 36$$

$$A = \left(\frac{384}{x} + 12 \right) (x+8)$$

$$A' = \frac{-384}{x^2} (x+8) + \left(\frac{384}{x} + 12 \right)$$

$$= \frac{-384(x+8) + 384x + 12x^2}{x^2} = 0$$

$$\rightarrow 0 = 12x^2 - 3072$$

$$x^2 = 256 \rightarrow x = 16$$

