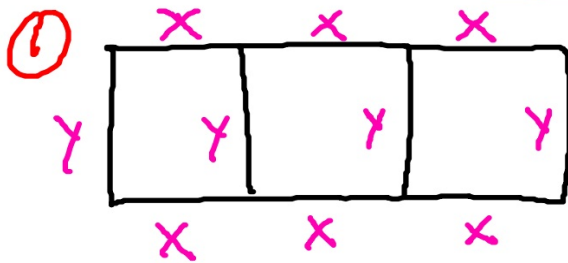


5.4) Additional Problems



$$6x + 4y = 500$$

$$4y = 500 - 6x$$

$$y = 125 - 1.5x$$

$$41.667 \text{ ft} \times 62.5 \text{ ft}$$

$$125 \text{ ft} \times 62.5 \text{ ft}$$

$$A = 3xy$$

$$A = 3x(125 - 1.5x)$$

$$A = 375x - 4.5x^2$$

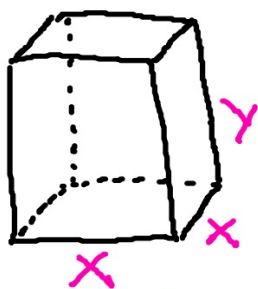
$$A' = 375 - 9x = 0$$

$$9x = 375$$

$$x = 41.667$$

$$y = 62.5$$

②



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

$$48 = x^2 + 4xy$$

$$\frac{48 - x^2}{4x} = y$$

$$V = x^2 y$$

$$V = x^2 \left(\frac{48 - x^2}{4x} \right)$$

$$V = \frac{48x}{4} - \frac{x^3}{4}$$

$$V = 12x - \frac{1}{4}x^3$$

$$V' = 12 - \frac{3}{4}x^2 = 0$$

$$\frac{3}{4}x^2 = 12$$

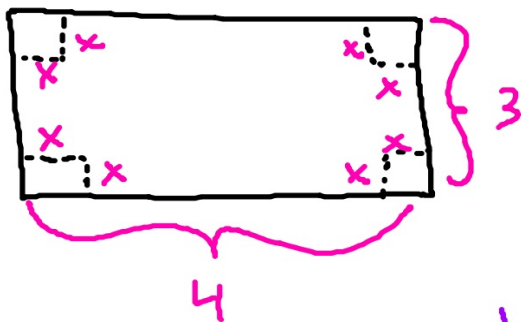
$$x^2 = 16$$

$$x = 4$$

$$y = 2$$

$$4f + x4f + x2f$$

⑧



$$V = (4 - 2x)(3 - 2x)x$$

$$V = (12 - 14x + 4x^2)x$$

$$V = 12x - 14x^2 + 4x^3$$

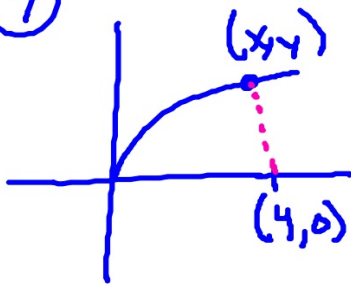
$$V' = 12x^2 - 28x + 12 = 0$$

$$4(3x^2 - 7x + 3) = 0$$

$$x = .566, \cancel{1.768}$$

$$2.968\text{ft} \times 1.868\text{ft} \times .566\text{ft}$$

④



$$d = \sqrt{(x-4)^2 + (y-0)^2}$$

$$d = \sqrt{(x-4)^2 + (\sqrt{x})^2}$$

$$d = \sqrt{x^2 - 8x + 16 + x}$$

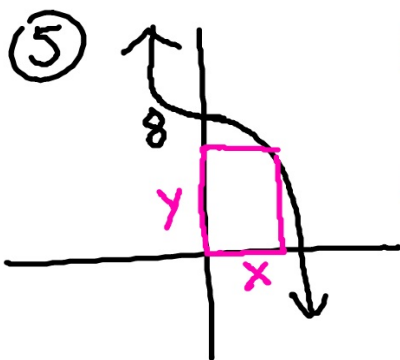
$$d = \sqrt{x^2 - 7x + 16}$$

$$d' = \frac{1}{2}(x^2 - 7x + 16)^{-1/2}(2x - 7) = 0$$

$$x = 3.5$$

$$y = 1.871$$

$$(3.5, 1.871)$$



$$A = xy$$

$$A = x(8 - x^3)$$

$$A = 8x - x^4$$

$$A' = 8 - 4x^3 = 0$$

$$4x^3 = 8$$

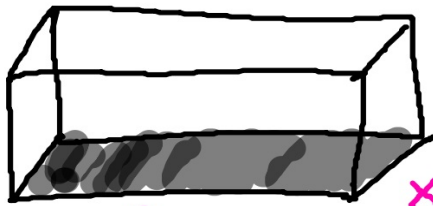
$$x^3 = 2$$

$$x = 1.26$$

$$y = 8 - (1.26)^3$$
$$y = 6$$

1.26×6

⑥



$3x$

$$V = 3x \cdot x \cdot y$$

$$50 = 3x^2 y$$

$$\frac{50}{3x^2} = y$$

$$5.646 \text{ ft} \times 1.882 \text{ ft} \times 4.706 \text{ ft}$$

$$SA = 2(\overset{T+B}{3x^2}) + 2(\overset{LR}{xy}) + 2(\overset{FB}{3xy})$$

$$SA = 6x^2 + 2xy + 6xy$$

$$\text{Cost} = 10(6x^2) + 6(8xy)$$

$$\text{Cost} = 60x^2 + 48x\left(\frac{50}{3x^2}\right)$$

$$\text{Cost} = 60x^2 + 800x^{-1}$$

$$\text{Cost}' = 120x - 800x^{-2} = 0$$

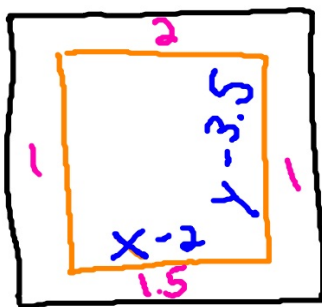
$$120x = \frac{800}{x^2}$$

$$120x^3 = 800$$

$$x^3 = 6.667$$

$$\left. \begin{array}{l} x = 1.882 \\ y = 4.706 \end{array} \right\}$$

⑦



x

$$A = xy$$

$$260 = xy$$

$$\frac{260}{x} = y$$

Poster: 10.69 in x 18.709 in
Print: 8.69 in x 15.209 in

$$A = (x-2)(y-3.5)$$

$$A = (x-2)\left(\frac{260}{x} - 3.5\right)$$

$$A = 260 - 3.5x - 460x^{-1} + 7$$

$$A = 267 - 3.5x - 460x^{-1}$$

$$A' = -3.5 + 460x^{-2} = 0$$

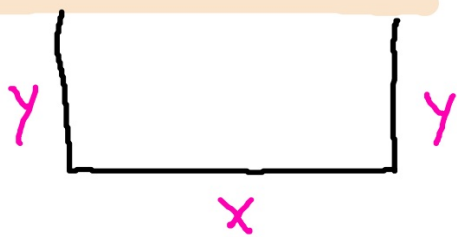
$$3.5 = \frac{460}{x^2}$$

$$3.5x^2 = 460$$

$$x^2 =$$

$$\left. \begin{array}{l} x = 10.69 \\ y = 18.709 \end{array} \right\}$$

⑧



$$x + 2y = 500$$

$$x = 500 - 2y$$

$$250\text{ft} + x(125\text{ft})$$

$$A = xy$$

$$A = (500 - 2y)y$$

$$A = 500y - 2y^2$$

$$A' = 500 - 4y = 0$$

$$500 = 4y$$

$$y = 125$$

$$x = 250$$