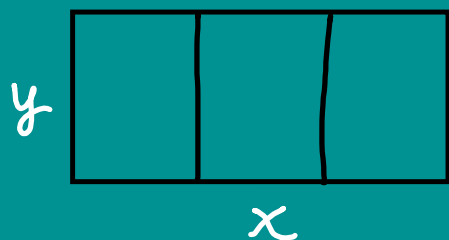


OPTIMIZATION



$(0, 750)$

$$\lim_{y \rightarrow 0} 1500y - 2y^2 = 0$$

$$\lim_{y \rightarrow 750} 1500y - 2y^2 = 0$$

$$\begin{array}{r} 375 \overline{) 281,250} \end{array}$$

$$A(375) = 281,250$$

$$A = xy$$

$$4y + 2x = 3000$$

$$\frac{2x}{2} = \frac{3000 - 4y}{2}$$

$$x = 1500 - 2y$$

$$A = (1500 - 2y)y$$

$$A = 1500y - 2y^2$$

$$A' = 1500 - 4y = 0$$

$$1500 = 4y$$

$$375 = y$$

$$x = 1500 - 2(375) = 750$$

$$375' \times 750'$$

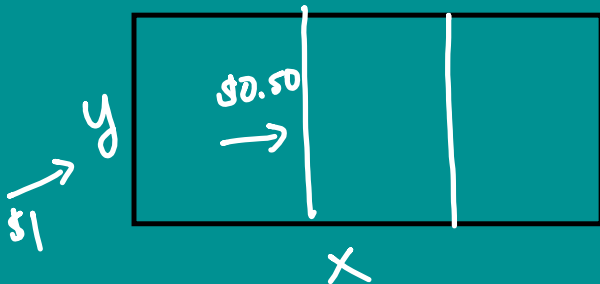
- 1) Draw a picture and label
- 2) Write formula for quantity to be maximized/minimized
- 3) If 2 variables, write a 2nd eq. with a limitation.
- 4) Change function into one variable.
- 5) Find critical points.
- 6) Build an interval & test end pts & crit pts. for max/min.
- 7) Calculate & write final Solutions.

$[,]$

- 1) Find crit pts
- 2) Test end pts
+ crit pts.
in original func.

$(,)$

- 1) Do limits of endpoints
- 2) Sub crit pts. in original
func.
- 3) Determine if crit
pts. are $>$ or $<$ the
limits.



$$y: (0, \infty)$$

$$\text{Area} = 303,750 \text{ ft}^2$$

$$C = \$1.2y + \$1.2x + \$0.502y$$

$$C = 3y + 2x$$

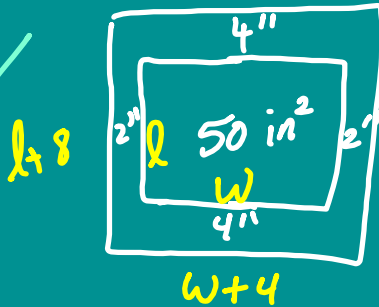
$$xy = 303,750$$

$$x = \frac{303,750}{y}$$

$$C = 3y + 2\left(\frac{303,750}{y}\right)$$

$$C = 3y + \frac{607500}{y}$$

3/



$$l: (0, \infty)$$

$$\lim_{l \rightarrow 0} 82 + 4l + \frac{400}{l}$$

$$82 + 0 + \infty = \infty$$

$$\lim_{l \rightarrow \infty} 82 + 4l + \frac{400}{l}$$

$$= 82 + \infty + 0 = \infty$$

$$10 \mid 82 + 40 + 40 = 162$$

$$\boxed{9 \text{ in} \times 18 \text{ in.}}$$

\uparrow \uparrow
 $5+4$ $10+8$

$$w = \frac{50}{10} = 5$$

$$A = (l+8)(w+4)$$

$$lw = 50$$

$$\Rightarrow w = \frac{50}{l}$$

$$A = (l+8)\left(\frac{50}{l} + 4\right)$$

$$A = 50 + 4l + \frac{400}{l} + 32$$

$$\boxed{A = 82 + 4l + \frac{400}{l}} l^{-1}$$

$$A' = 4 - \frac{400}{l^2} = 0$$

$$4 = \frac{400}{l^2}$$

$$4l^2 = 400$$

$$\sqrt{l^2} = \sqrt{100}$$

$$l = 10$$

4/ BUSINESS

$$C(x) = 600 + 3x$$

$$R(x) = 4x - 0.0002x^2$$

x thousand ornaments

$$[1, 10,000]$$

Maximize

$$P = R - C$$

$$P(x) = 4x - 0.0002x^2 - (600 + 3x)$$

$$P(x) = x - 0.0002x^2 - 600$$

$$P'(x) = 1 - 0.0004x = 0$$

$$1 = 0.0004x$$

$$2500 = x$$

10,000,000

$$\begin{array}{r} 1 \\ 2500 \\ 10,000 \end{array}$$