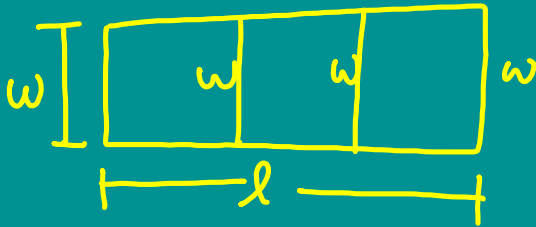


OPTIMIZATION



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

$$* A = 1500w - 2w^2$$

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

$$1500 = 4w$$

$$375 = w$$

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.

$$A = lw$$

$$4w + 2l = 3000 \leftarrow$$

$$\frac{2l}{2} = \frac{3000 - 4w}{2}$$

$$l = 1500 - 2w$$

$$w: (0, 750)$$

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

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

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

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

$$750' \times 375'$$

[,]

1) Find crit pts

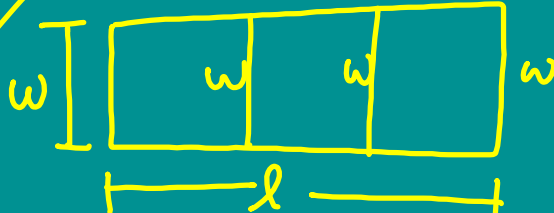
2

end
end
crit

(,)

Find crit pts
limits on end points

2/



$$C = 3w + 2 \left(\frac{303750}{w} \right)$$

$$* C = 3w + \frac{607500}{w}$$

$$C' = 3 - \frac{607500}{w^2} = 0$$

$$w^2 \cdot 3 = \frac{607500}{w^2} \cdot w^2$$

$$\frac{3w^2}{3} = \frac{607500}{3}$$

$$\sqrt{w^2} = \sqrt{202500}$$

$$w = 450$$

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

$$C = \$1(2w + 2l) + 0.50(2w)$$

$$C = 3w + 2l$$

$$l = \frac{303,750}{w}$$

$$l = \frac{303750}{w}$$

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

$$\lim_{w \rightarrow 0^+} 3w + \frac{607500}{w} = 0 + \infty = \infty$$

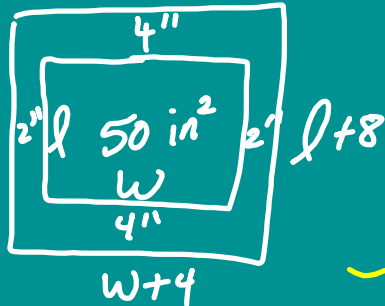
$$\lim_{w \rightarrow \infty} 3w + \frac{607500}{w} = \infty + 0 = \infty$$

$$C(450) = \$2700 \quad 450'$$

$$l = \frac{303750}{450} = 675$$

$$675' \times 450'$$

3/



$$A = lw$$

$$(l-8)(w-4) = 50$$

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

$$lw = 50$$

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

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

← Foil
&
do
deriv

BUSINESS

1000 - 10,000,000

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

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

[1, 10,000]

Profit = Revenue - Cost

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

$$* P = x - 0.0002x^2 - 600 \quad | \quad x =$$

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

$$\frac{10000}{4} = \frac{1}{0.0004} \frac{0.0004x}{0.0004}$$

$$2500 = x$$

$$\begin{array}{r} 1 \\ 10000 \\ \hline 2500 \end{array}$$