

7. $P = 100$ m
 maximize area of
 rectangle $l \times w$

$$A = lw$$

$$100 = 2l + 2 \cdot 25$$

$$100 = 2l + 50$$

$$50 = 2l$$

$$P = 2l + 2w = 100$$

$$l = 25$$

$$2l = 100 - 2w$$

$$l = 50 - w$$

$$A = (50 - w)w$$

$$A = 50w - w^2$$

$$\frac{dA}{dw} = 50 - 2w$$

$$0 = 50 - 2w$$

$$2w = 50$$

$$w = 25 \text{ maximum}$$

$$\frac{d^2A}{dw^2} = -2$$

$$lw = 64 \quad l = \frac{64}{w}$$

$$P = 2l + 2w$$

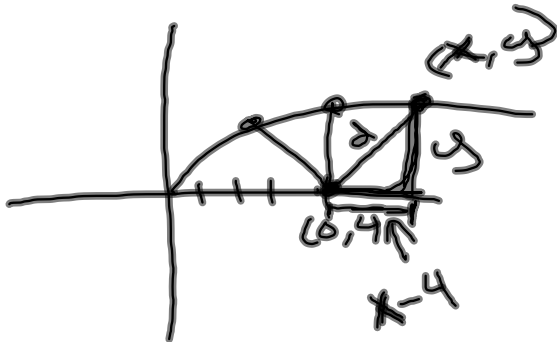
$$P = 2\left(\frac{64}{w}\right) + 2w$$

$$P = \frac{128}{w} + 2w$$

$$\frac{dP}{dw} = -128w^{-2} + 2$$

$$-2 = -\frac{128}{w^2} \quad w^2 = 64$$

$$\frac{-2w^2}{-2} = \frac{-128}{-2} \quad w = 8$$



$$f(x) = \sqrt{x}$$

$$y = \sqrt{x}$$

$$y^2 = x$$

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

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

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

$$\frac{dd}{dx} = \frac{1}{2} (x^2 - 7x + 16)^{-1/2} (2x - 7)$$

$$0 = \frac{2x - 7}{\sqrt{x^2 - 7x + 16}}$$

$$2x - 7 = 0$$

$$x = 3.5$$

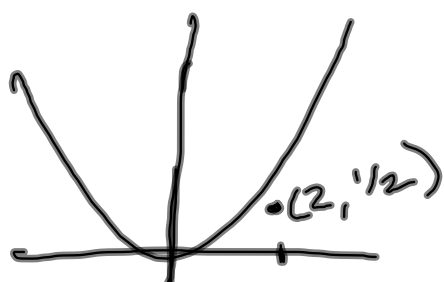
$$x^2 - 7x + 16 = 0$$

$$x = \frac{7 \pm \sqrt{7^2 - 4(1)(16)}}{2(1)}$$

$$y = \sqrt{x}$$

$$y = 1.87$$

$$(3.5, 1.87)$$



$$d = \sqrt{(x-2)^2 + (y-\frac{1}{2})^2}$$



$$d = \sqrt{(x-2)^2 + (x^2 - .5)^2}$$

$$d = \sqrt{x^2 - 4x + 4 + x^4 - x^2 + .25}$$

$$d = \sqrt{x^4 - 4x + 4.25}$$