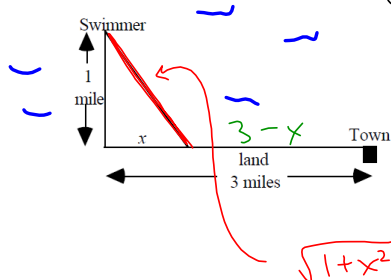


Example 5) I am 1 mile in the ocean and wish to get to a town 3 miles down the coast which is very rocky. I need to swim to the shore and then walk along the shore. What point should I swim to along the shoreline so that the time it takes to get to town is a minimum? I swim at 2 mph and walk at 4 mph.



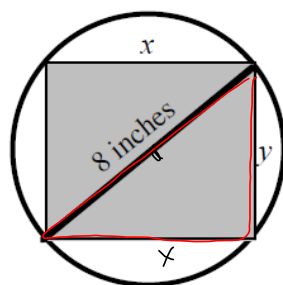
$$\text{time} = \text{time}_{\text{swim}} + \text{time}_{\text{walk}}$$

$$\text{time} = \frac{\sqrt{1+x^2}}{2} + \frac{3-x}{4}$$

$$r \cdot t = d$$

$$t = \frac{d}{r}$$

Example 6) . Find the dimensions of the largest area rectangle which can be inscribed into a circle of radius 4 inches.



*primary*

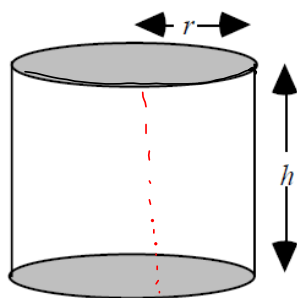
$$\text{area} = xy$$

*secondary*

$$x^2 + y^2 = 64$$

How would this problem change if the radius were  $r$  inches?

Example 7) A 6-oz. can of Friskies Cat food contains a volume of approximately 14.5 cubic inches. How should the can be constructed so that the material made to make the can is a minimum?



*Primary*  
Surface Area = Area of side + Area of Top & bottom  
 $S = 2\pi rh + 2\pi r^2$

*Secondary*  
 $V = \pi r^2 h$

$$14.5 = \pi r^2 h$$
$$h = \frac{14.5}{\pi r^2}$$