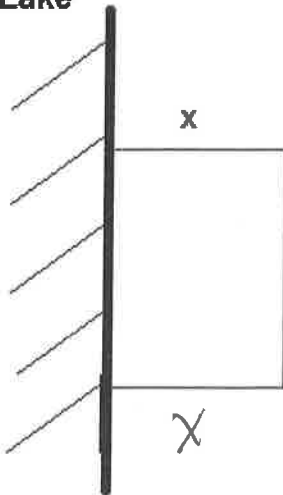


Lake



A picnic area on the edge of a lake is roped off with a 400 ft. rope (assume the lake's edge is straight and longer than 400 ft).

- a) Letting  $x$  be the side touching (perpendicular to) the lake, write a function for the area,  $A(x)$

$$A(x) = L \cdot W$$

$$A(x) = (400 - 2x) \cdot x = -2x^2 + 400x$$

- b) Find the dimensions that produce the maximum area.

~~x~~-word:  $h = \frac{-b}{2a} = \frac{-400}{2(-2)} = 100 \text{ ft}$

Vertex

$$L = 400 - 2(100) = 400 - 200 = 200 \text{ ft}$$

- c) What is the maximum area?

$$A = (100 \text{ ft})(200 \text{ ft}) = 20,000 \text{ ft}^2$$

Alternatively:

$$\begin{aligned} A(100) &= -2(100)^2 + 400(100) \\ &= -20,000 + 40,000 = 20,000 \text{ ft}^2 \end{aligned}$$