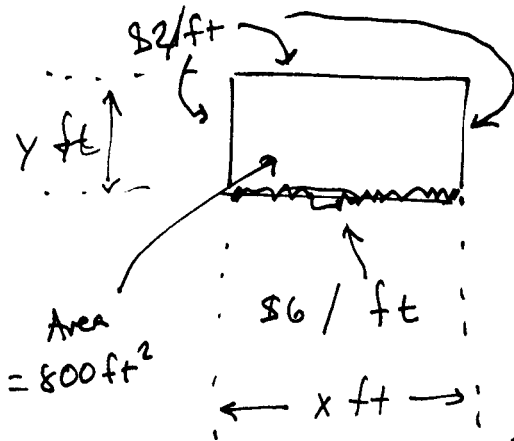


§ 3.4 12) Garden area = 800 ft^2 

One side of fencing costs 6 dollars/ft

The other three cost 2 dollars/ft

What should the dimensions of the garden be to minimize the cost of the fencing? What is the minimum cost?

to a solution:

$$\text{Area} = 800 \text{ ft}^2 = xy \Rightarrow y = \frac{800}{x} \text{ ft}$$

$$C = \text{cost of fencing} = 6x + 2x + 2y + 2y$$

$$= 8x + 4y$$

$$= 8x + 4\left(\frac{800}{x}\right)$$

$$C(x) = 8x + \frac{3200}{x} = 8x + 3200x^{-1}$$

$$0 = C'(x) = 8 - 3200x^{-2}$$

Solve $8 - \frac{3200}{x^2} = 0$ Multiply by x^2 :

$$8x^2 - 3200 = 0$$

$$8(x^2 - 400) = 0$$

$$8(x-20)(x+20) = 0$$

$$\boxed{x = 20 \text{ ft}} \text{ or}$$

$$\text{So } y = \frac{800}{20} = \boxed{40 \text{ ft}}$$

$$\text{min cost} = C(20) = 8(20) + 4(40)$$

$$= 160 + 160 = \boxed{320 \text{ dollars}}$$

