

Classwork 6

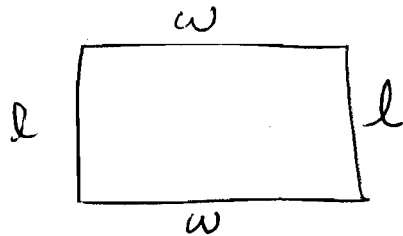
College Algebra and Trigonometry, MTH 123, Section 3260, Fall 2011

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Name: SOLUTIONS

1. A rancher wants to build a rectangular pen with perimeter of 100 m. Find the dimensions that will maximize the area.



$$\text{Perimeter} = 100\text{m}$$

$$2l + 2w = 100$$

$$2(l + w) = 100$$

$$l + w = 50$$

$$w = 50 - l$$

$$\text{Area} = l \cdot w$$

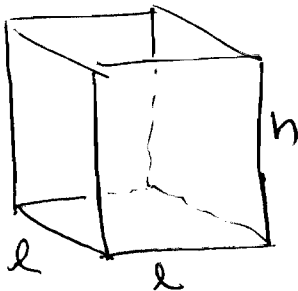
$$A(l) = l(50 - l)$$

$$A(l) = 50l - l^2, \quad a = -1 < 0 \Rightarrow \text{max}$$

$$\text{max at } l = -\frac{b}{2a} = -\frac{50}{-2} = 25$$

$$w = 50 - 25 = 25 \quad \boxed{\text{Dimensions: } 25\text{m} \times 25\text{m}}$$

2. A box with an open top and square base is to have volume 12 ft³. Find the function that models the surface area of the box in terms of one of its sides.



$$\text{Volume} = l \times w \times h$$

$$\text{Square base} \Rightarrow l = w$$

$$\text{Volume} = l^2 h = 12$$

$$h = \frac{12}{l^2}$$

$$\text{Surface area} = l^2 + 4lh$$

$$\boxed{S(l) = l^2 + \frac{48}{l}}$$