C3L4 Notes
Build Quadratic Models from Verbal Descriptions and From Data

1. The price p (in dollars) and the quantity x sold of a certain product obey the demand equation

a. Find a model that expresses the revenue R as a function of x. (Remember: R = xp)

b. What is the domain of R?

c. What is the revenue if   units are sold?

d. What quantity x maximizes revenue? What is the maximum revenue?

e. What price should the company charge to maximize revenue?

2. The price p (in dollars) and the quantity x sold of a certain product obey the demand equation

a. Express the revenue R as a function of x.

b. What is the revenue if   units are sold?

c. What quantity x maximizes revenue? What is the maximum revenue?

d. What price should the company charge to maximize revenue?

e. What price should the company charge to earn at least $ in revenue?

3. David has _____ **yards of fencing and wishes to enclose a rectangular area.**

a. Express the area A of the rectangle as a function of the width w of the rectangle.

b. For what value of w is the area largest?

c. What is the maximum area?

4. A farmer with _____ **meters of fencing wants to enclose a rectangular plot that borders on a river. If the farmer does not fence the side along the river, what is the largest area that can be enclosed?**

5. A projectile is fired from a cliff 200 feet above the water at an inclination of 45° to the horizontal, with a muzzle velocity of 50 feet per second. The height h of the projectile above the water is modeled by

$$h(x) = \frac{-32x^2}{(50)^2} + x + 200$$

where x is the horizontal distance of the projectile from the face of the cliff.

a. At what horizontal distance from the face of the cliff is the height of the projectile a maximum?

b. Find the maximum height of the projectile.

c. At what horizontal distance from the face of the cliff will the projectile strike the water?

d. Using a graphing utility, graph the function h, $0 \le x \le 200$.

e. Use a graphing utility to verify the solutions found in parts (b) and (c).

f. When the height of the projectile is 100 feet above the water, how far is it from the cliff?