2.3: Applications of Quadratics to Business Math III

Objective:
- Profit, Revenue, and Cost with **Quadratics**

**TOOLS FOR CONSTRUCTING**

**Revenue = (selling price)** $\cdot x$   where $x$ is the number of units sold

**Costs = (variable cost)** $\cdot x$ **+ fixed cost**   where $x$ is the number of units produced

**PROFIT = (Revenue) – (Cost)**

COMPETITIVE MARKET

MONOPOLY MARKET

**TOOLS FOR ANALYZING**

MAXIMIZE, use VERTEX  $x = -\dfrac{b}{2a}$ is the units, then evaluate the function to find max $$$.

BREAKEVEN:  R = C

R – C = 0   then use the quadratic formula $x = \dfrac{-b \pm \sqrt{b^2 - 4ac}}{2a}$

1. In a monopoly market, the demand for a product is $p = 1600 - x$ where $x$ is the number of units sold.

a. Find the Revenue function

b. Find the maximum Revenue and the number of units sold that will maximize Revenue.

c. Find the price that will maximize revenue.

2. Consider the revenue and cost functions given below.

$$C(x) = 2000 + 40x + x^2$$
$$R(x) = 130x$$

a. Is this a monopoly or competitive market?

b. Find the Profit function.

c. Find and interpret the maximum profit

d. Find and interpret the breakeven points

3. In a monopoly market, the demand function is $p = 500 - 2x$. Fixed costs are 3600 and variable costs are given by $100 + 2x$

a. Find and interpret the maximum Profit and the number of units produced and sold that will maximize Profit

b. Find and interpret the breakeven points.

c. Find and interpret the selling price that will maximize profits.