Applications: Cost, Revenue, and Profit may all be quadratic functions.

Ex A company sells AC's and finds that the profit for selling x units is $P(x) = 40x - 0.02x^2 - 250$ dollars.

(a). What is the profit if they don't sell any AC's?

(b). What is the profit if they sell 50 AC's?

(c). How many AC's must they sell to maximize profit?

(d). What is the maximum profit?

<u>**Ex**</u> A travel course with 15 students charges \$3000 per student. For each additional student above 15, the price is reduced by \$80 per student.

(a). Construct a table that gives the revenue generated for $15, 16, 17, \ldots$ students. Let ___ x ___ represent the increase in group size above 15 students.

(b). Write an equation that gives the revenue as a function of x additional students. Simplify.

(c). Find the number of additional students x to maximize revenue and the maximum revenue.

(d). What number of total students should they cap the size of the class?

<u>Ex</u> The cost to produce x units is given by $C = 12800 + 40x + 0.2x^2$ and the revenue is given by $R = 400x - 0.8x^2$.

(a). Find the break-even point(s).

(b). Sketch cost and revenue functios on the same set of axes.

(c). Find the maximum revenue.

(d). Find the profit P and the maximum profit.

(e). Sketch the profit function P.

In a monopoly market (one supplier), the revenue is restricted by the demand.

$\Rightarrow$ Price is given by the demand function. i.e. $p = f(x)$ for x units sold.

$\Rightarrow$ Total Revenue = price $\cdot$ number of units i.e $R = p \cdot x \Rightarrow R = f(x) \cdot x$

Ex In a monopoly market, the demand for a product is given by $p = 220 - 0.6x$ and the revenue is given by $R = px$ where x is the number of units sold. What price will maximize revenue?

More Applications: Supply and Demand Curves may also be quadratic functions.

Ex Supply: $p = \frac{1}{2}q^2 + 6q + 16$ Demand: $p = 288 - 8q - 2q^2$

(a). Sketch the supply and demand curves in the first quadrant.

(b). Find the market equilibrium point.