# Day 27 is Monday, March 25, 2013

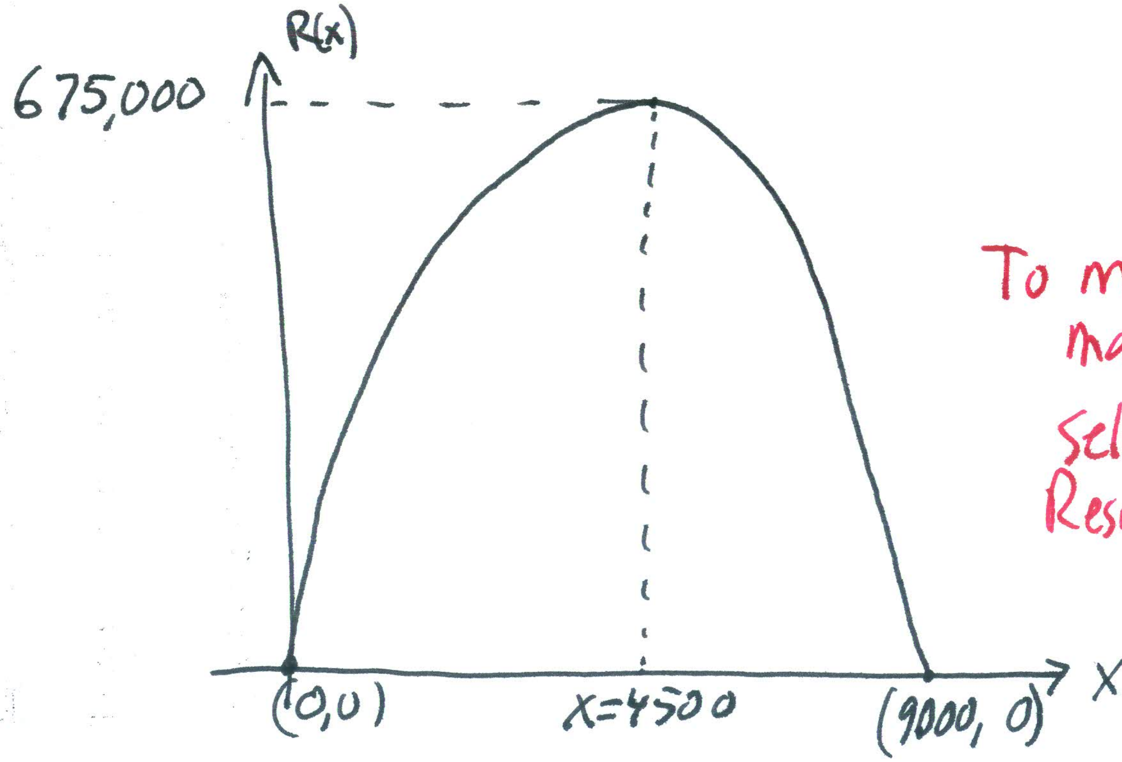
Reviewing + Continuing Thursday's example involving company making cameras.

Plot the Revenue function. $R(x) = 300x - \frac{x^2}{30}$

Will be parabola facing down.

Three known points (from Thursday)

| x | R(x) |
|---|---|
| 0 | 0 |
| 4500 | 675,000 |
| 9000 | 0 |




To maximize weekly Revenue, make 4500 cameras per week

Sell them for \$150 per camera

Resulting Revenue will be \$675,000 per week.

(B) New Question: If the goal is to maximize the weekly Profit, how many cameras should be made each week, and what should be the selling price per camera?

Solution

Profit = Revenue − Cost

$$P(x) = R(x) - C(x)$$

(capital P)

$$= \left(300x - \frac{x^2}{30}\right) - \left(\underbrace{90{,}000}_{\text{"fixed costs"}} + \underbrace{30x}_{\text{"variable costs"}}\right)$$

$$= -\frac{x^2}{30} + 270x - 90{,}000$$

domain is still $0 \le x \le 9000$ because $P(x)$ equation used $R(x)$, and the $R(x)$ equation is only valid on that domain

Goal: maximize the function

$$P(x) = \frac{-x^2}{30} + 270x - 90{,}000$$

on the domain $0 \le x \le 9000$

Find critical value by setting $P'(x) = 0$ and solving for $x$.

$$P'(x) = \left(-\frac{1}{30}\right)(2x) + 270$$

$$= -\frac{x}{15} + 270$$

Set $P'(x) = 0$:

$$0 = -\frac{x}{15} + 270$$

$$\frac{x}{15} = 270$$

$$x = 4050$$