4.7

Note Title 10/28/2007

Average cost of producing x items (in cost per item) is

$$a(x) = \frac{C(x)}{x}$$

marginal cost - instantaneous rate of change of cost w/ respect to # of items sold. marginal cost $= \frac{dC}{dx}$ where

$C(x)$ = cost of producing x items

When the average cost is a minimum, then marginal cost = average cost

ex. It costs $C(x) = 5x^2 + 12x + 100$ dollars to produce x computers

a. Find the cost, average cost, & marginal cost of producing 100 computers

$C(100) = \$51,300$ to make 100 computers

avg cost $= 51,300/100 = \$513$ per computer

marginal cost $= 10x + 12 = \$1012$

b. Minimize avg cost $\Rightarrow$ marginal cost = avg cost

$$10x + 12 = 5x + 12 + 100/x$$

$$5x^2 - 100 = 0$$

$$x^2 = 20$$

$$x = \sqrt{20}$$

Price function $p(x)$ price charge per unit
↳ note: lower case

Revenue function $R(x) = x \cdot p(x)$

Marginal Revenue function $R'(x)$

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

Marginal Profit function $P'(x)$

When profit is maximized then
marginal revenue = marginal cost

Ex #16 pg 321
If you sell necklaces for \$10, you'll sell 20 per day. When increase by \$1 loose 2 sales per day. If it costs \$6 to make each one. How much should you charge?

Max profit

price $= 10 + 1d$ items sold $= 20 - 2d$

price $= 20 - \frac{1}{2}x$ $\quad x - 20 = -2d$

$\hookrightarrow d = 10 - \frac{1}{2}x$

Revenue $= 20x - \frac{1}{2}x^2$

Profit $= 20x - \frac{1}{2}x^2 - 6x = 14x - \frac{1}{2}x^2$

$P' = 14 - x = 0 \Rightarrow x = 14$

price $= 20 - \frac{1}{2}(14)$
$= \$13$