Wednesday, September 18, 2013 (Day 14)

Be sure to swipe your I.D.

Exam Friday I will be checking your ID's during the exam. (sorry!)

Section 3-7 Marginal Analysis

Business Terminology

Demand, Price, Revenue, Cost, Profit

from Reference 5 in Course Packet (page 4)

We will not cover "Average Quantities" this semester.

Marginal Quantities

"Marginal Quantity" means "The Derivative of Quantity"

Example: "Marginal Revenue" means $R'(x)$. etc.

Examples involving a company with

Revenue function $R(x) = .5x - .02x^2$

Cost function $C(x) = 145 + 1.1x$

(A) Find the marginal cost function.

Solution

Marginal Cost $= C'(x)$

$= \frac{d}{dx}\left(145 + 1.1x\right)$ identify Multiplicative Constants

$= 145\left(\frac{d}{dx}1\right) + 1.1\left(\frac{d}{dx}x\right)$

$= 145(0) + 1.1(1)$

$= 1.1$

(B) Find the Marginal Revenue

Solution

Marginal Revenue $= R'(x)$

$$= \frac{d}{dx}(5x - .02x^2)$$

$$= 5\left(\frac{d}{dx}x\right) - .02\left(\frac{d}{dx}x^2\right)$$

$$= 5(1) - .02(2x)$$

$$= 5 - .04x$$

(c) Find the marginal Profit

Solution

$$\text{Profit} = \text{Revenue} - \text{Cost}$$

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

$$\text{Marginal profit} = P'(x)$$

$$= \frac{d}{dx}\left(P(x)\right)$$

$$= \frac{d}{dx}\left(R(x) - C(x)\right)$$

$$= \frac{d}{dx}R(x) - \frac{d}{dx}C(x)$$ used sum rule

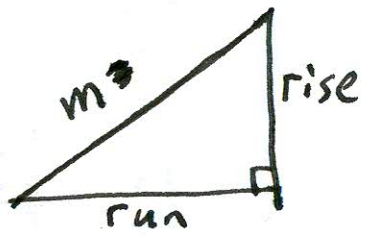
$$= R'(x) - C'(x)$$

marginal profit = $(5 - .04x) - (1.1)$

$= 3.9 - .04x$

Estimation Problems

Review slope calculations



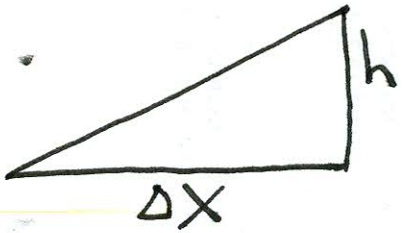
$$\text{slope} \quad m = \frac{\text{rise}}{\text{run}}$$

trick: multiply both side of this equation by "run"

$$m \cdot \text{run} = \left(\frac{\text{rise}}{\text{run}}\right) \cdot \text{run}$$

$$m \cdot \text{run} = \text{rise}$$

Use different terminology



$$m = \frac{h}{\Delta x}$$

multiply both sides by Δx

$$m \cdot \Delta x = h$$

turn this around

$$h = m \cdot \Delta x$$