REVIEW for TEST THREE

20090415 11

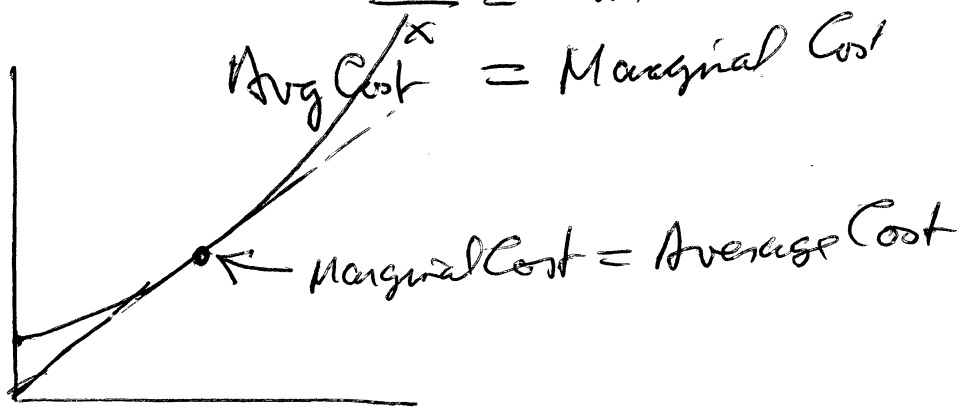
From 165lnexp.key.pdf

Average Cost per Unit $\frac{C(x)}{x}$

Minimized at $\frac{d(\text{Avg})}{dx} = \frac{xC'(x) - C(x)}{x^2} = 0$

or $\frac{C(x)}{x} = C'(x)$

Avg Cost = Marginal Cost



Relative Rate of Change of a Quantity $F(t)$ $W(t)$; $S(T)$

$\frac{\frac{dF}{dt}}{F}$ Percentage Rate $\frac{100\frac{dF}{dt}}{F}$

60% in Stocks (S) decreasing at 3%

40% in bonds (B) increasing at 3%

Total Portfolio = S + B = P

Relative Rate of change

$\frac{\frac{dS}{dt}}{S} = -.03$ $\frac{\frac{dB}{dt}}{B} = +.03$

SECTION 4.3

$\frac{\frac{dS}{dt} + \frac{dB}{dt}}{S+B} = \frac{-.035 + .03B}{S+B} = \frac{-.03(.60)(S+B) + .03(.40)B}{S+B}$

$= (-.20)(.03) = -.006$

$= .6\%$

"Exponential Demand Curves

$p = \cancel{200} = D(q) = 200e^{-.25q}$

Maximize Revenue $q(200e^{-.25q})$

Maximize Profit (cost = $10q$)

$\frac{dR}{dq} = 200e^{-.25q} - .25q\,e^{-.25q}$

$= e^{-.25}q(1-.25q)$

$= 0$ when $q = \frac{1}{.25} = 4$

$\cancel{200e^{-.25q} = 10q}$

~~Not~~ $(p-10)q$

$= (qe^{-.25q} - 10q)$

$= q(200e^{-.25q} - 10)$

$\frac{dP}{dq} = 200e^{-.25q} - 10 + q(200)(-.25)e^{-.25q}$

$= (200(1-.25)qe^{-.25q} - 10$

~~(Not so easy~~

gustavo: $q = e^{-.2p}$ NOT the same problem

$q = Ae^{-.2p}$ Cost $10 per unit

$R = pq = Ape^{-.2p}$ $\frac{dR}{dp} = 0$

Profit $= A(p-10)e^{-.02p}$

$\frac{dP}{dp} = A\left[e^{-.02p} + (-.02)(p-10)e^{-.02p}\right]$

$p - 10 = \frac{1}{.02}$

Note $q = Ae^{-.2p}$ then $\ln(q) = -.2p$ $p = \ln q$

(N.B)

side note

$$p = Ae^{-bq}$$

$$\frac{p}{A} = e^{-bq}$$

$$\ln\left(\frac{p}{A}\right) = -bq$$

$$\frac{\ln\left(\frac{p}{A}\right)}{-b} = \frac{-bq}{b}$$

$$q = \frac{\ln p - \ln(A)}{-b} \qquad \left(\frac{p}{A} < 1\right)$$

IVP

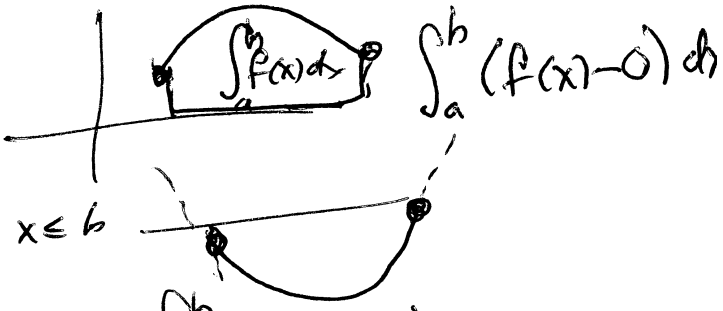
$$\begin{cases} F' = \text{given} \\ F(2) = 8 \end{cases}$$

$F = \int \text{given}(x)\,dx + C$

$8 = \text{formula} + C$

$8 = \text{formula at } 2 + C$

Area under graph [POS] above x-axis



Area below x axis $a \le x \le b$

$$\text{Area} = -\int_a^b f(x)\,dx = \int_a^b (0 - f(x))\,dx$$

Average of $300 - 2x$, $0 \le x \le 150$

$$\frac{1}{150}\int_0^{150} [300 - 2x]\,dx$$

$$= \frac{1}{150}\left[300x - \frac{x^2}{\cancel{600}}\right]\Big|_{x=0}^{x=150}$$

$$= \frac{1}{150}\left(300 \cdot 150^2 - \frac{150^2}{\cancel{600}}\right) - \left(\underbrace{\quad}_{0}\right)$$

$$= \frac{1}{150}(150)(300 - 150) = 150!$$

+ 165 test three sample 2009.pdf