ELASTICITY OF DEMAND

Note Title 4/16/2019

- SUPPOSE x REPRESENTS A QUANTITY OF GOODS SOLD, AND P IS THE PRICE PER UNIT

  $\therefore \quad x = D(P)$

- SUPPOSE THERE IS A CHANGE IN THE PRICE ΔP

  $\therefore$ THE PERCENT CHANGE IS $\frac{\Delta P}{P}$

  - THE CHANGE IN PRICE WILL CHANGE THE UNITS SOLD

$\therefore$ THE PERCENT CHANGE IS $\frac{\Delta x}{x}$

– THE RATIO OF % CHANGE IS

$$\frac{\frac{\Delta x}{x}}{\frac{\Delta p}{p}} \quad \underline{\underline{OR}} \quad \frac{p}{x} \cdot \frac{\Delta x}{\Delta p}$$

FOR CONTINUOUS FUNCTIONS $\lim_{\Delta p \to 0} \frac{\Delta x}{\Delta p} = \frac{dx}{dp}$

SO $\frac{p}{x} \cdot \frac{dx}{dp}$ OR $\frac{p}{x} \cdot D'(p)$ OR $\frac{p}{D(p)} \cdot D'(p)$

$\therefore$ THE ELASTICITY OF DEMAND

$$E(p) = \frac{-p\, D'(p)}{D(p)}$$

USE NEG ∴ $D'(p)$ IS ALWAY NEG.

— FOLLOWS LAW OF DEMAND

PRICE INCREASE / DEMAND DECREASE

∴ TOTAL REVENUE IS A MAXIMUM FOR VALUES OF

p FOR WHICH $E(p) = 1$

IE FOR THE DEMAND FUNCTION $x = D(p)$, $D(p) = 400 - p$

A) FIND THE QUANTITY OF DEMAND WHEN $p = \$200$

B) FIND THE ELASTICITY FUNCTION

C) FIND THE ELASTICITY FN WHEN $p = \$100$ AND $p = \$500$

D) FIND p WHEN $E(p) = 1$

E) FIND $R(p)$

F) FIND MAX REVENUE

SOLN A) $x = D(p) = 400 - p$

$= 400 - 200$

$D(200) = 200$ UNITS.

B) $E(p) = \dfrac{-p \cdot D'(p)}{D(p)}$ $\qquad D(p) = 400 - p$

$D'(p) = -1$

$= \dfrac{-p \cdot -1}{400 - p} = \dfrac{p}{400 - p}$

C) $E(100) = \dfrac{100}{400 - 100} = \dfrac{1}{3}$

$$E(500) = \frac{500}{400-500} = -5$$

* $E(P) < 1$ = INELASTIC

PRICE UP = REVENUE UP

$E(P) > 1$ = ELASTIC

PRICE UP = REVENUE DOWN

D) $E(P) = 1$

$$1 = \frac{P}{400-P}$$

$$400 - P = P$$

$$400 = 2P$$

$$200 = P$$

E) $R(p) = \text{PRICE} \times \text{QUANTITY}$

$R(p) = p \times D(p)$

$= p \times (400 - p)$

$= 400p - p^2$

F) $R(200) = 400(200) - 200^2$

$= \$40{,}000$

H/W Pg 332 # 3, 7, 10, 13, 14