Problem Set #1-Key

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Economics 305-Intermediate Microeconomic Theory

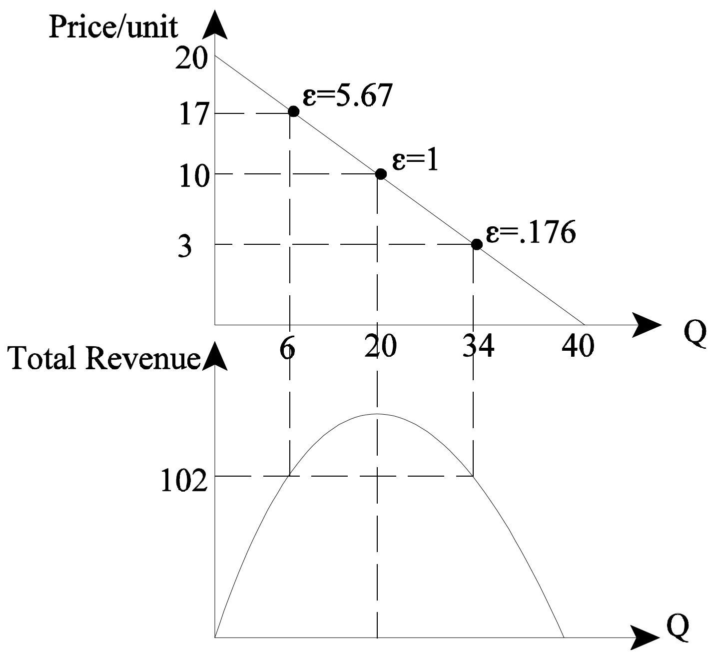
(1) Total Revenue=P*Q; $P_1*Q_1=3*34=\$102$
$P_2*Q_2=17*6=\$102$

(2) Linear Demand $Q^D=a-bP$, where b= $\frac{\Delta Q}{\Delta P}=\frac{Q_2-Q_1}{P_2-P_1}$.

Given the two points provided above, you can solve for b, so that -b = $\frac{6-34}{17-3}=-2$, this gives you

$Q^D=a-2P$. Now, plug in P&Q to solve for a, 34 = a-2(3)=> a = 40. This gives you $Q^D= 40-2P$.

(3) Graph of linear demand and total revenue curve.



(4) At what price do consumers no longer purchase this product?

At a price of \$20 per unit, consumers purchase zero units.

(5) If this good was given away, say as a promotional strategy, how many units would you need to produced?

At a price of zero, 40 units will be consumed.

(6) Calculate the price elasticity of demand at each of the two points in question (1). Interpret each.

To find the price elasticity of demand at P_1Q_1=(3,34), solve $\varepsilon_P^D = \frac{\Delta Q}{\Delta P}\frac{P}{Q}$ =>-2(3/34)= -.17.

To find the price elasticity of demand at P_2Q_2=(17,6), solve $\varepsilon_P^D = \frac{\Delta Q}{\Delta P}\frac{P}{Q}$ =>-2(17/6)=-.5.67.

(7) If the goal was to maximize revenue, what price should John and Kathy Lee charge? What quantity will be sold?

From the relationship shown above, you can see that for a linear demand curve, total revenue is maximized at the mid-point of the demand curve. So the revenue maximizing price is P = $10 and the revenue maximizing quantity is Q = 40 units.

(8) Given the elasticities, it is clear that price needs to be raised above $3.00 and dropped below $17.00. To increase total revenue you should choose a price between $3.00 and $17.00.

(9) Using the information provided above, derive the equation for a linear demand curve. Show graphically.

Given P=$500, Q=7,500, ε^S=-.33 and ε^D=-.33, you can solve for a linear demand curve as follows.

The general form of a demand curve is Q^D = a-bP. where a is the x-intercept and b = $\frac{\Delta Q}{\Delta P}$.

From the definition of elasticity you know that $\varepsilon_P^D = \frac{\Delta Q}{\Delta P}\frac{P}{Q}$, where b = $\frac{\Delta Q}{\Delta P}$

To solve for b, set -.33= $\varepsilon_P^D = \frac{\Delta Q}{\Delta P}\frac{500}{7{,}500}$ and solve for b = $\frac{\Delta Q}{\Delta P}$. b = 4.95.

Q^D= a- 4.95P

To solve for a, substitute the price and quantity into the above demand equation and solve for a. => 7,500 = a - 4.95(500)=> a = 9,975.

Q^D=9,975 - 4.95P.

(10) Using the information provided above, derive the equation for a linear supply curve. Show graphically.

The equation for the linear supply curve is solved similarly.

To solve for the supply curve, set .33= $\varepsilon_P^D = \frac{\Delta Q}{\Delta P}\frac{500}{7{,}500}$ and solve for d= $\frac{\Delta Q}{\Delta P}$ =d. d = 4.95.

Substitute d into the linear supply equation and solve for c. Q^S=c + 4.95P
=> 7,500= c+ 4.95(500)=>a = 5,025.
Q^S= 5,025 + 4.95P.