MR and Elasticity of Demand

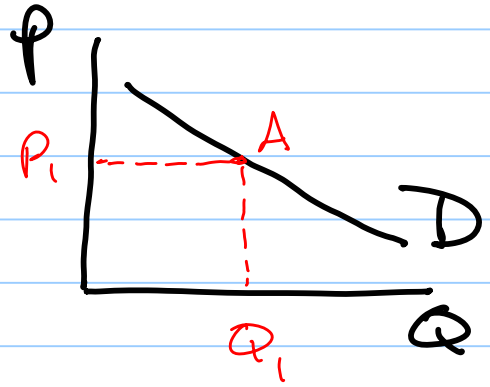
Note Title 2/2/2006

(1) P = Price
Q = Quantity Demanded

TR = total revenue = total expenditure = $P \cdot Q$

$TR = P \cdot Q$

(2) $P = f(Q)$ 'price is a function of Q'



note: at pt. A $TR = P_1 \cdot Q_1$

(3) $TR = P \cdot Q$

using calculus product rule

$$\frac{\partial TR}{\partial Q} = P\frac{\partial Q}{\partial Q} + Q\frac{\partial P}{\partial Q}$$

$$MR = P + Q\frac{\partial P}{\partial Q}$$

(4) as noted above $MR = \frac{\partial TR}{\partial Q}$

or as usually written $MR = \frac{\Delta TR}{\Delta Q}$

(5) $E_D = -\frac{\Delta Q/Q}{\Delta P/P} = -\frac{\Delta Q}{\Delta P} \cdot \frac{P}{Q}$

where $\frac{\Delta Q}{\Delta P}$ is $\frac{1}{\text{slope}}$ of Demand Curve

and $\frac{\Delta Q}{\Delta P}$ is used for $\frac{\partial Q}{\partial P}$

(6) Repeat from (3)

$$MR = P + Q\frac{\partial P}{\partial Q}$$

$$= P + P\left[\frac{Q}{P}\frac{\partial P}{\partial Q}\right]$$

$$MR = P\left[1 - \frac{1}{E_D}\right]$$