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Elasticity of Demand:

→ It is a measure of changes in the quantity Demanded in response to the change in the price of commodity.

→ Effect of change of price on the quantity Demanded is called as the elasticity of Demand.

$$E = \frac{\%\ \Delta \text{ Demand of product}}{\%\ \Delta \text{ price of product}}$$

$$E = \frac{\Delta Q \times P}{\Delta P \times Q}$$

$\Delta Q \rightarrow Q_1 - Q_2$ $\quad Q_1 \rightarrow$ New quantity

$\Delta P = P_1 - P_2$ $\quad Q_2 \rightarrow$ original quantity

importance of Elasticity of Demand:

(1) The concept of Demand elasticity helps in understanding the price determination by the monopolist.

→ The price a monopolist chooses for his product depends of elasticity of Demand.

(2) The determination of price depends on Demand for and supply to the commodity

(3) The concept of elasticity of Demand also helps the government in its taxation policies

(4) This concept also helps in the determination of wages (salary)

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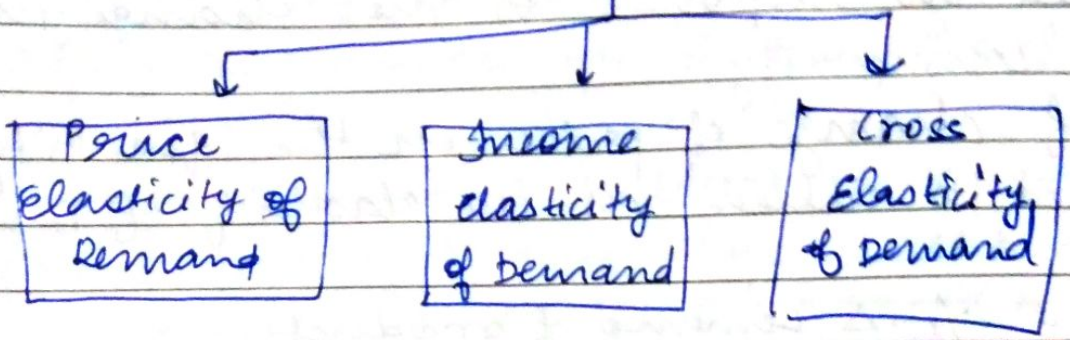
Types of Elasticity of Demand:

① ~~Price Elasticity of Demand~~:



① Price Elasticity of Demand:

If there is a change in ~~Quan~~ Quantative Demanded of a commodity due to change in price of that commodity, then it is k/A Price elasticity of Demand.

$$e_p = \frac{\% \text{ change in quantity Demanded}}{\% \text{ change in Price}}$$

$$e_p = \frac{Q_1^{new} - Q^{old}}{Q} \times \frac{P}{P_1 - P}$$

* Ignore minus sign in calculation.

Types of Price Elasticity / Degrees of Elasticity :-

① Perfectly Elastic Demand
② Perfectly inelastic Demand
③ Relatively Elastic Demand
④ Relatively inelastic Demand
⑤ Unitary Elastic Demand.

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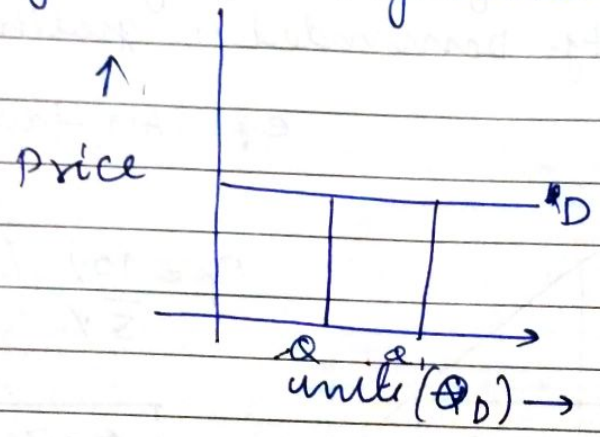
① Perfectly Elastic Demand: ($e_p = \infty$)
If there is no change / slightest change in price of a commodity results in infinite change in Quantity Demanded of that commodity

eg: bikes (price ↑)

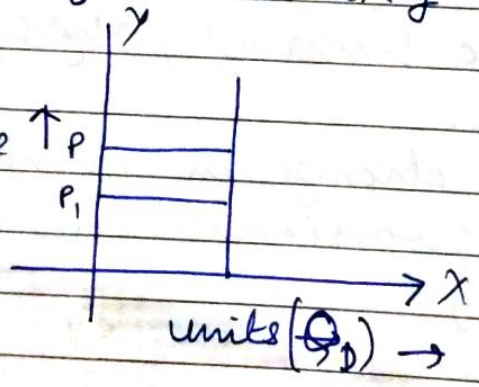


$e_p = \frac{10\%}{0}$ $\left\{\frac{\Delta Q}{P}\right\}$

$e_p = \infty$

② Perfectly Inelastic Demand: ($e_p = 0$)
If there will be no change / slightest change in Quantity Demanded and continuously change in price of commodity

eg: emergency service / drugs & essential food



$e_p = \frac{0}{10\%}$ $\left(\frac{\Delta Q}{\Delta P}\right)$

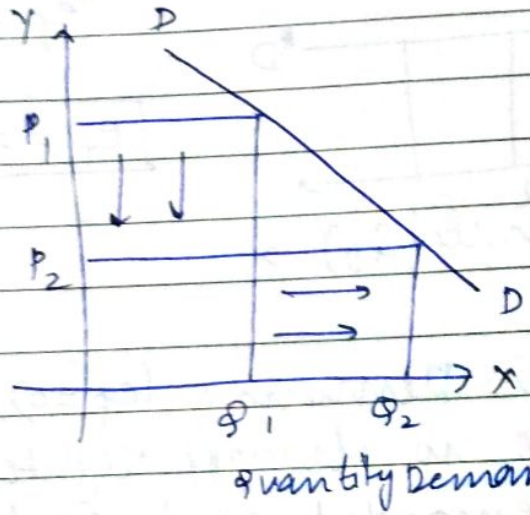
$e_p = 0$

(3) Relatively Elastic Demand / Highly Elastic Demand: ($e_p > 1$)

→ Relatively small change in price cause relatively large change in quantity

→ % change in quantity Demanded is greather than % change in price

eg: Air fair & bus fair



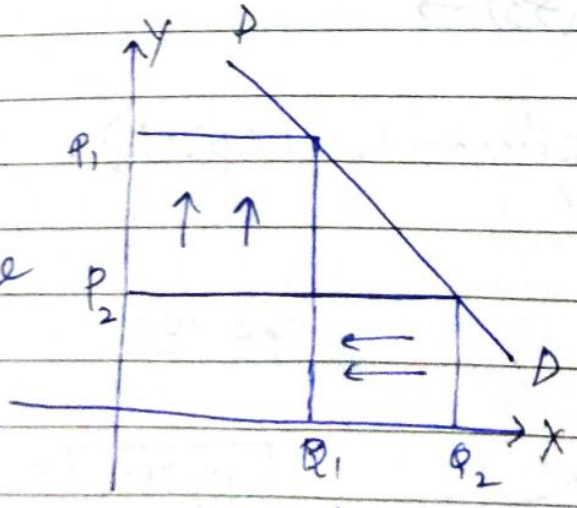
$e_p = \frac{10\%}{5\%} \left(\frac{-\% \cdot \Delta Q}{\% \cdot \Delta P}\right)$

$e_p > 1$

(4) Relatively inelastic Demand / Highly inelastic Demand: ($e_p < 1$)

→ When proportionate change in Quantity Demanded is lesser than the proportionate change in the price of a commodity.

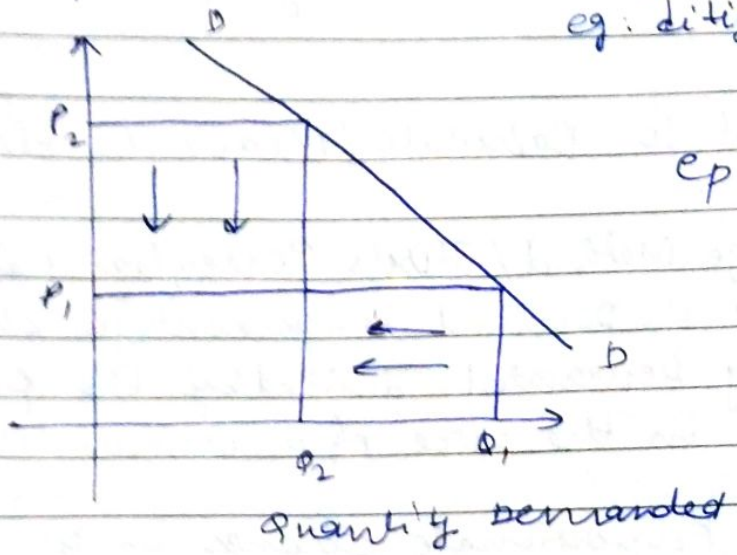
eg: Price of petrol.



$e_p = \frac{5\%}{10\%} \left(\frac{\% \cdot \Delta Q}{\% \cdot \Delta P}\right)$

$e_p < 1$

(3) Unitary Elastic Demand:
The proportionate change in demand is equal to proportionate change in price.
eg: ditigal cameras.



$e_p = 0$

(2) Income elasticity of Demand:
It is the proportionate change in the quantity Demanded of a commodity due to change in the income of the consumer.

$$e_p = \frac{\text{proportionate change in QD}}{\text{proportionate change in Price}}$$

$$e_p = \frac{Q_1 - Q}{Q} \times \frac{i}{i_1 - i}$$

(3) Cross elasticity of demand:
proportionate change in the quantity Demanded of a commodity (say X) due to ~~pro~~ change in the price of related good. (say Y).

$$e_p = \frac{\text{proportionate change in QD of X}}{\text{proportionate change in price of Y}}$$

$$e_p = \frac{Q_{1x} - Q_x}{Q_x} \times \frac{P_y}{P_{1y} - P_y}$$

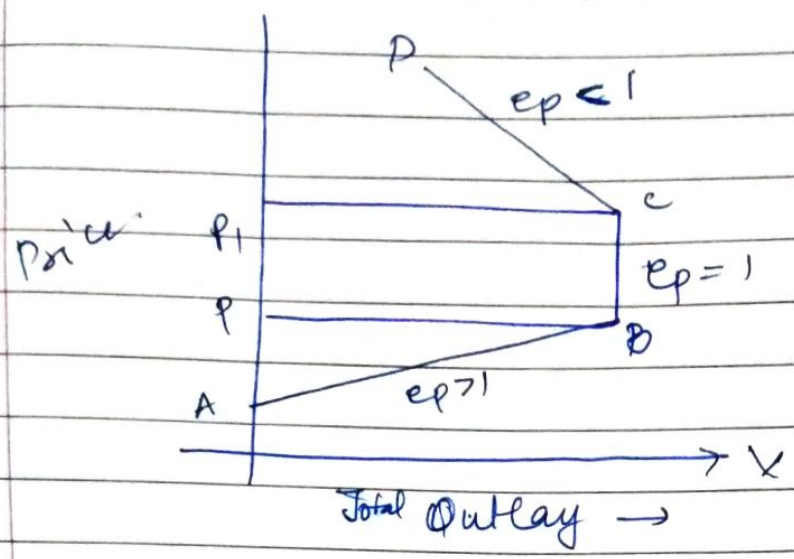
Method to Calculate / Measure Elasticity of Demand

(1) Percentage Method / Flux's Percentage Method:
Elasticity of Demand is percentage change in Quantity Demanded divided by the percentage change in the price of a commodity.

$$E_p = \frac{\text{Proportionate change in QD}}{\text{proportionate change in price}}$$

(2) Total Outlay Method:
Prof Alfred Marshall "The price elasticity of Demand is change in the total outlay incurred on the commodity in response to a change in the price of the commodity".

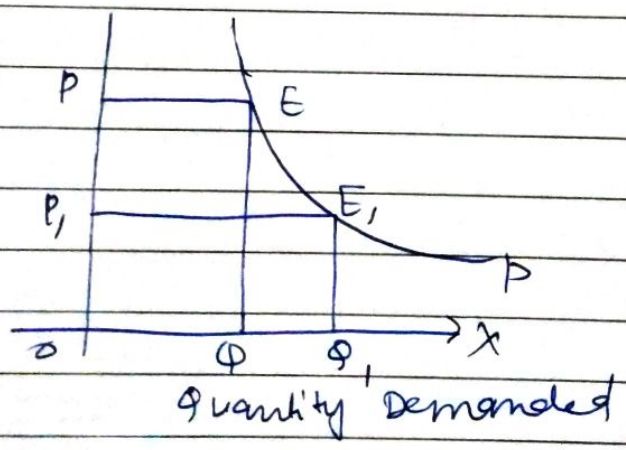
→ If the total outlay on the commodity ↑ due to change in its price, the price elasticity will be greater than one ($e_p > 1$).
→ If the total outlay decreases, the price elasticity will be less than one ($e_p < 1$)
→ total outlay remains constant the price elasticity will be '1' ($e_p = 1$)



(3) Arc Method / Proportionate Method:

→ When the shape of the Demand curve is arc shaped.

→ It is used when the changes in the quantity Demanded of a commodity with the change in its price is very large.



E_p = % change in Q_D / % change in Price $\Rightarrow E_p = \frac{\Delta Q \cdot P}{\Delta P \cdot Q}$

(4) Point Method (main Notes)

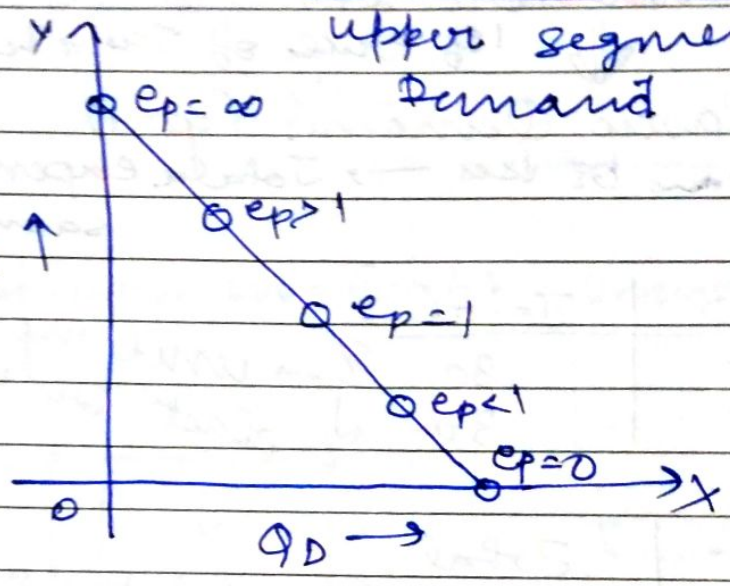
Another formula for Arc Method:

$E_p = \frac{(\Delta Q)(P_1 + P_2)}{(Q_1 + Q_2)\Delta P}$

Methods of calculating elasticity of Demand:

(*) Point Method:
This method used when the demand curve is linear not curvy linear demand curve.

e_p = lower segment of the demand curve / upper segment of the Demand curve.



Total Expenditure Method:

(1) Arc Method:

$$e_p = \frac{\frac{\Delta q}{q_1 + q_2}}{\frac{\Delta P}{P_1 + P_2}} \Rightarrow e_p = \frac{\Delta q}{q_1 + q_2} \times \frac{P_1 + P_2}{\Delta P}$$

where:
q_1 = Old quantity
q_2 = New quantity
P_1 = Old Price
P_2 = New Price