## Elasticities of Demand :-

There are as many elasticities of demand as its determinants. The most important of these elasticities

(A) The price elasticity of demand :-

Elasticity of demand is defined as the proportionate change in quantity demanded resulting from a very small proportionate change in price.

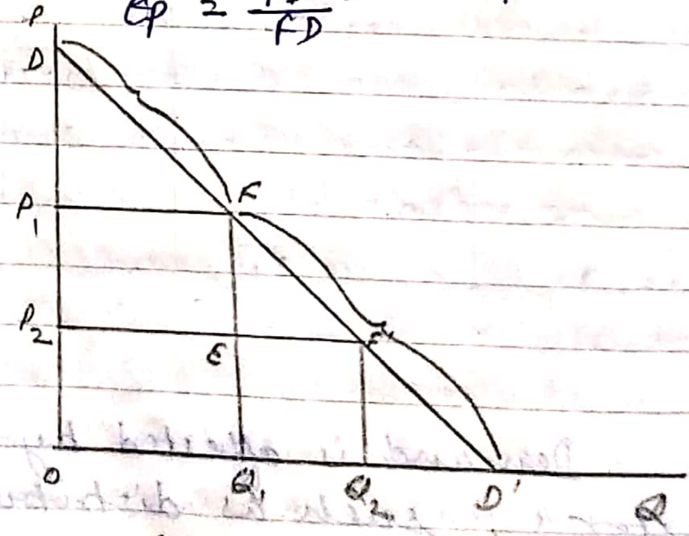
$$e_p = \frac{dQ}{Q} \Big/ \frac{dP}{P}$$

or

$$e_p = \frac{dQ}{dP} \times \frac{P}{Q}$$

The elasticity changes at the various points of the linear demand curve. The point elasticity of a linear demand curve is shown by the ratio of the segments of the line to the right and to the left of the particular point.

$$e_p = \frac{FD'}{FD}$$




Proof :- $\Delta P = P_1P_2 = EF$, $\Delta Q = Q_1Q_2 = EF'$

$P = OP_1$, $Q = OQ_1$

$$e_p = \frac{EF'}{EF} \cdot \frac{OP_1}{OQ_1}$$

From fig triangles $FEF'$ and $FQ_1D'$ are similar. Hence

$$\frac{EF'}{EF} = \frac{Q_1D'}{FQ_1} = \frac{Q_1D'}{OP_1} \quad \ldots (1)$$

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$$e_p = \frac{Q_1 D'}{OP_1} \cdot \frac{OP_1}{OQ_1} = \frac{Q_1 D'}{OQ_1}$$

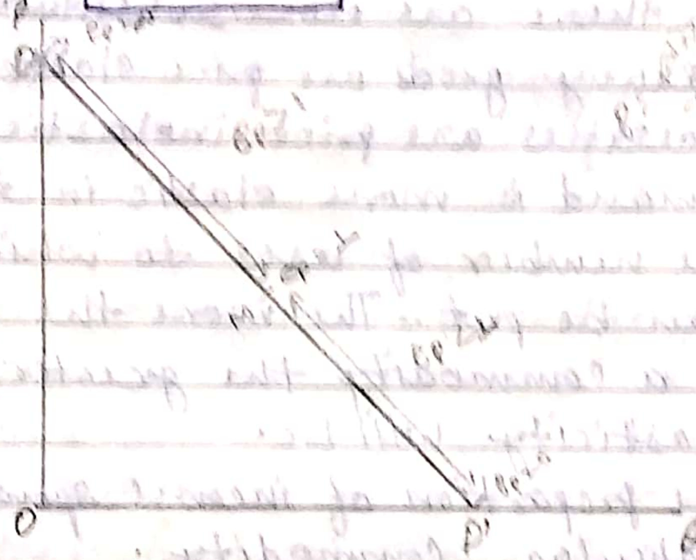
the triangles $DP_1F$ and $FQ_1D'$ are similar, so

$$\frac{Q_1 D'}{FD'} = \frac{P_1 F}{FD} = \frac{OQ_1}{FD}$$

Rearranging we obtain

$$\frac{Q_1 D'}{OQ_1} = \frac{FD'}{FD}$$

$$\boxed{e_p = \frac{FD'}{FD}}$$



In fig. A linear demand curve $e_p = 1$ at point M. any point to the right of M the $e_p < 1$ and left of M $e_p > 1$ at point D $e_p \to \infty$ and at point D' $e_p = 0$.

The price elasticity is always negative because of the inverse realationship between Q and P implied by law of Demand.

If $e_p = 0$ the demand is perfectly inelastic.
If $e_p = 1$ the demand is unitary elastic.
If $e_p = \infty$ the demand is perfectly elastic.
If $0 < e < 1$ the demand is inelastic.
If $1 < e < \infty$ the demand is elastic.

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