MICROECONOMICS

(BCS 2002 & BSE 2002)/BA]

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(C) DEMAND AND SUPPLY

DEMAND

LECTURE-7(iii)

ELASTICITY OF DEMAND

Objectives

- To understand the meaning of responsiveness of demand to changes in determinants of demand.
- To lay down the degrees of responsiveness of demand.
- To discuss various types of elasticities of demand.
- To learn how to measure elasticity by various methods.
- To understand the relevance and application of elasticities of demand

(1) What is Elasticity?

Normally elasticity is referred to as the responsiveness of the quantity demanded, as a result of a change in factor that affects the demand. In other words, it is the rate of change in the quantity demanded with respect to the rate of change in the factor.

… (1) Measurement of Elasticity

When we talk about elasticity of demand we generally refer to price elasticity of demand. However it can be measured with reference any other factor that affect the demand (e.g. Income, related goods).There are following two methods of measurement of elasticity.:

1. **Point Method**
2. **Arc method**

… (1) Measurement of Elasticity

(1) The **Point Elasticity** method when the changes in price and quantity demanded is very small. Hence, it is easy to calculate the elasticity at a point. And because changes are quite little, one can take the original price and quantity, as a base.

(2) What to do when the change is substantial? One can neither take the initial price nor the final price as a base. In such a case we use the **Arc Elasticity** method, wherein we take an average of both initial and final prices and quantities of demand.

{Note: **Percentage** change and **proportionate** change are equivalent (e.g. 12% or 0.12) and will give same value of elasticity estimate]

..(2) PRICE ELASTICITY OF DEMAND

Price Elasticity of Demand is:

$$\%\Delta Q \quad \%\Delta P$$

- *ΔQ=Change in quantity demanded*
- *ΔP=Change in unit price*

(3) POINT & ARC ELASTICITY

Elasticity =%°*Q* %°*P*

1. Point Elasticity:

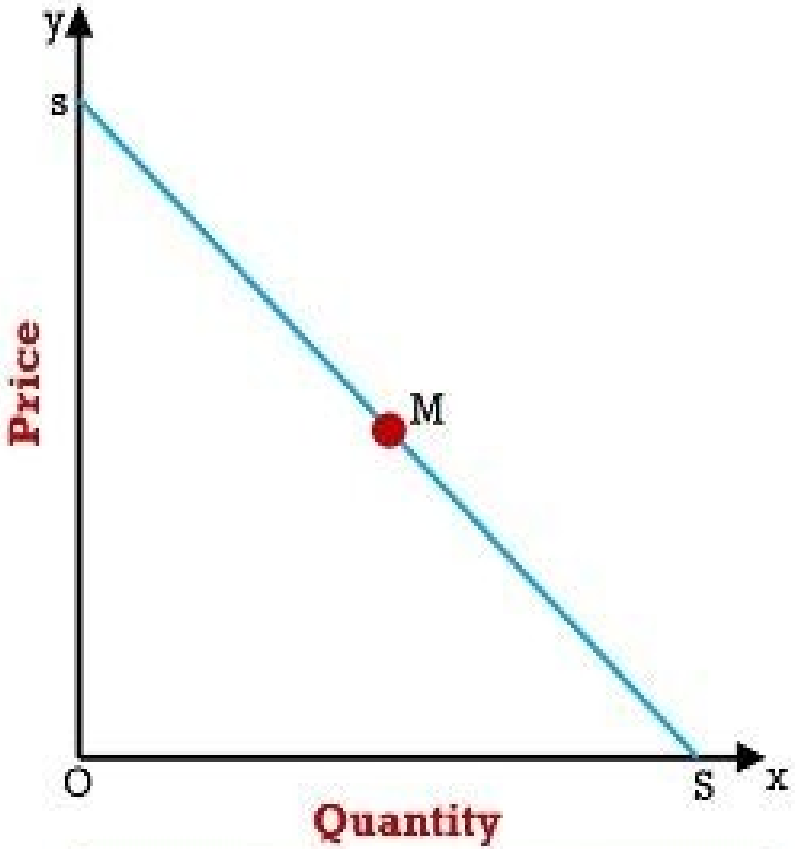
[°*Q*/ *Q*]÷[°P/P]

2. Arc Elasticity:

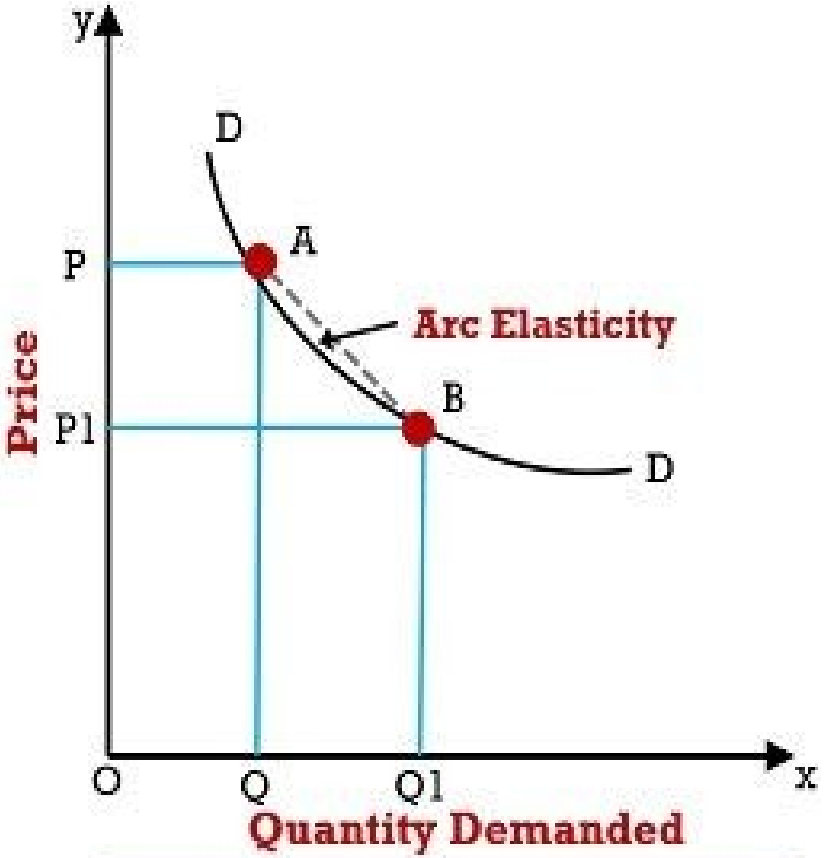
[°Q/ (Q1+Q2)]÷[°P/(P1+P2)]

[Illustration with Example – Next Slide]

POINT & ARC ELASTICITY

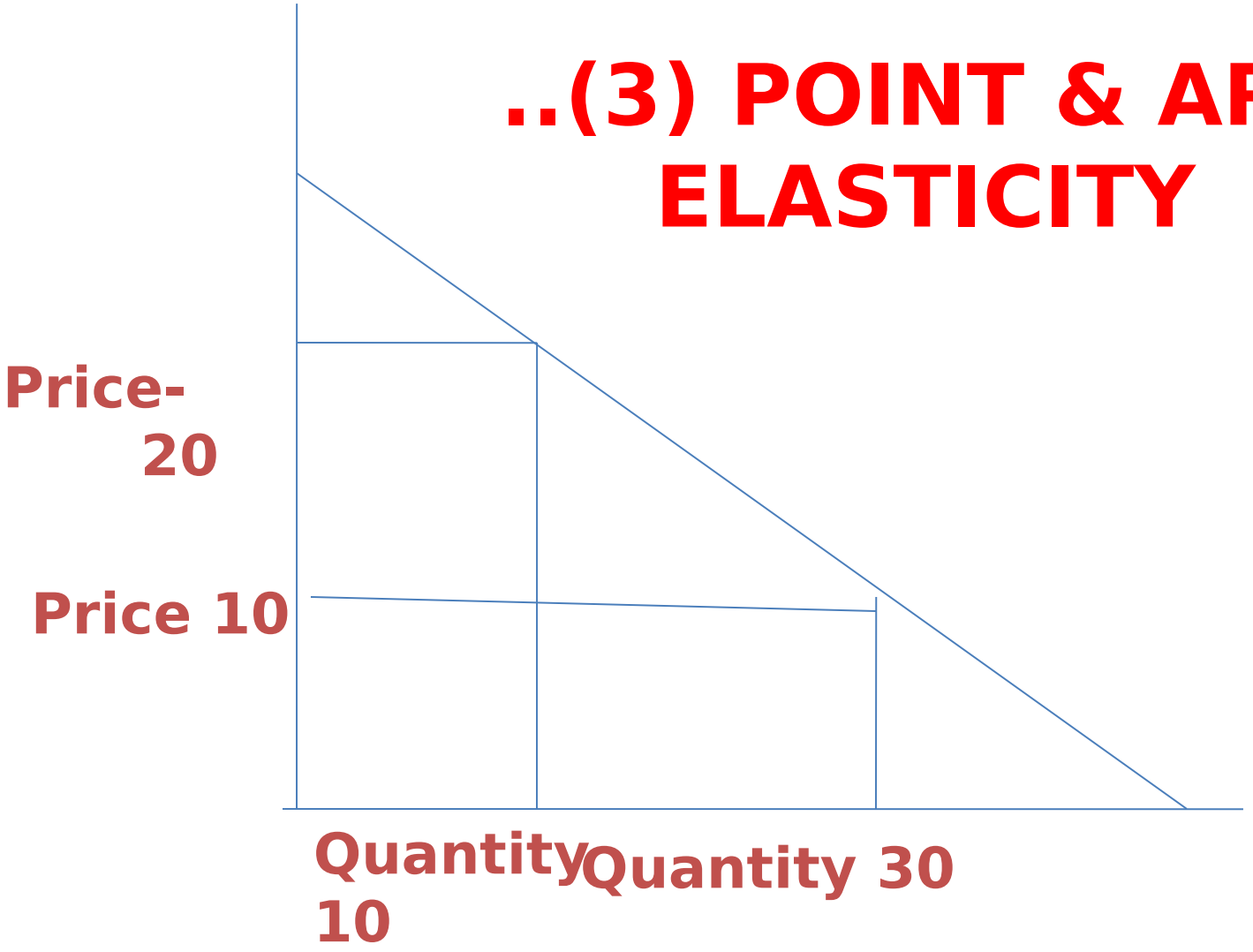


Point Elasticity



Arc Elasticity

..(3) POINT & ARC ELASTICITY



Price Increases from Rs-10 to Rs 20 per Unit & Demand decreases fro 30 to 10:

- **POINT ELASTICITY:**

$$Ę=[°Q/Q]÷[°P/P] = [-20/30] ÷[10/20]=-1.3$$

- **ARC ELASTICITY:**

$$Ę=[°Q/(Q1+Q2)]÷[°P/(P1+P2)]$$

$$=$$

$$[-20/(20+30] ÷[-10/10+20)]=-1.2$$

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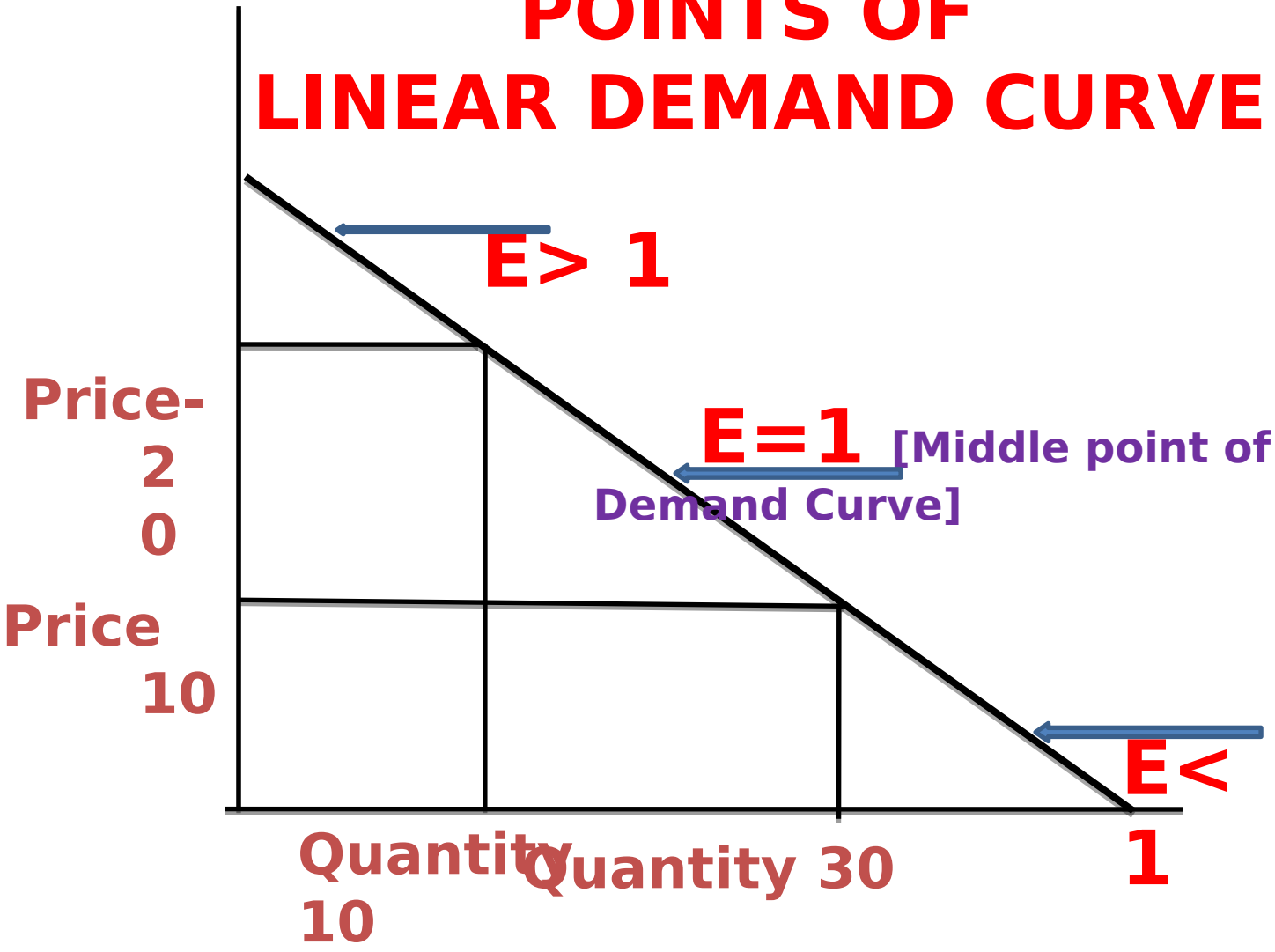
…(3) POINT & ARC ELASTICITY:

Conclusion:

- **The difference between point and arc elasticity lies in the size of the change in price and quantity demanded.**
- **Therefore, Point Elasticity is true for small movements only from one point to another along the demand curve. Conversely, when the changes in price and quantity are discrete and large, we need to calculate elasticity over an arc of the demand curve (known as Arc Elasticity)**

….3. ELASTICITY AT DIFFERENT POINTS OF LINEAR DEMAND CURVE

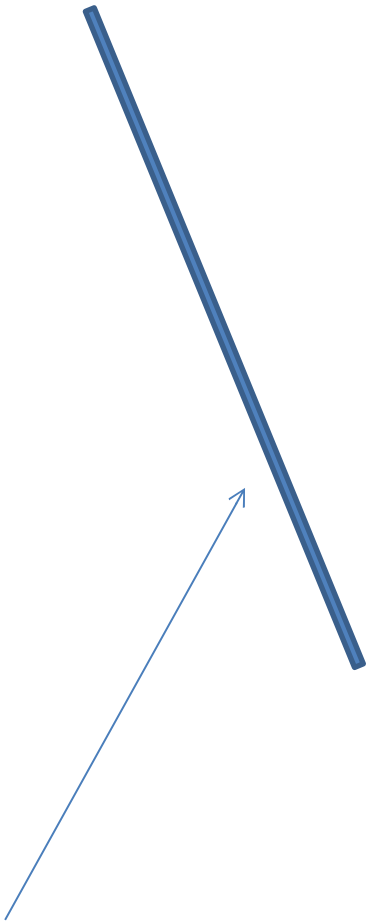


…3.ELASTIC AND INELASTIC DEMAND

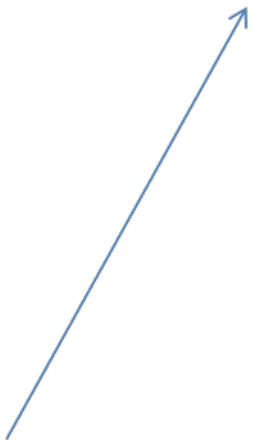
- **Perfectly elastic**: infinity
- **Elastic**: Greater than one
- **Unit elastic**: One
- **Inelastic**: Less than one
- **Perfectly inelastic**: Zero

Note that except Zero and Infinity the sign of Elasticity will always be Negative

….3. **Inelastic Demand**



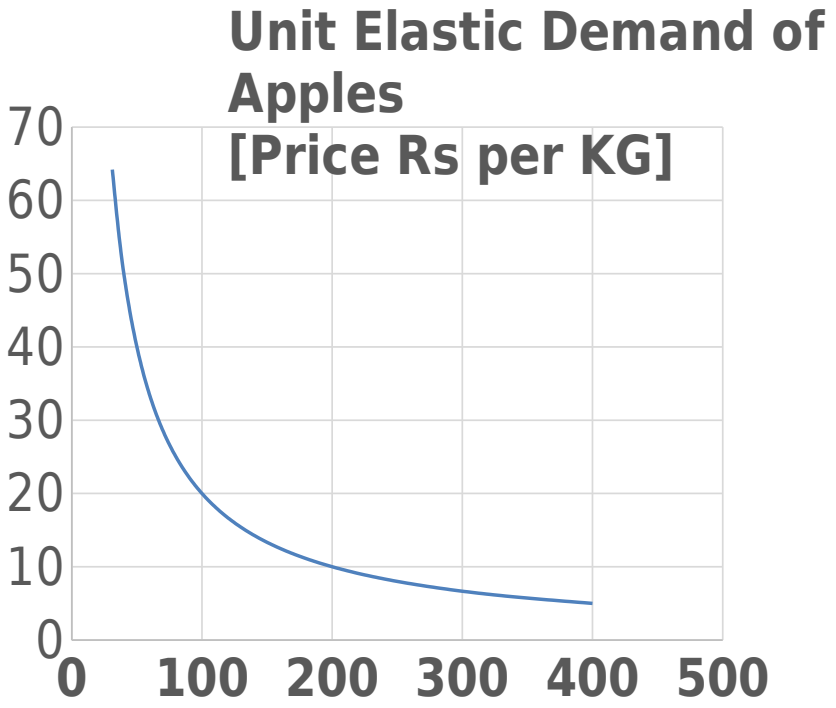
…..3. Unit Elastic Demand



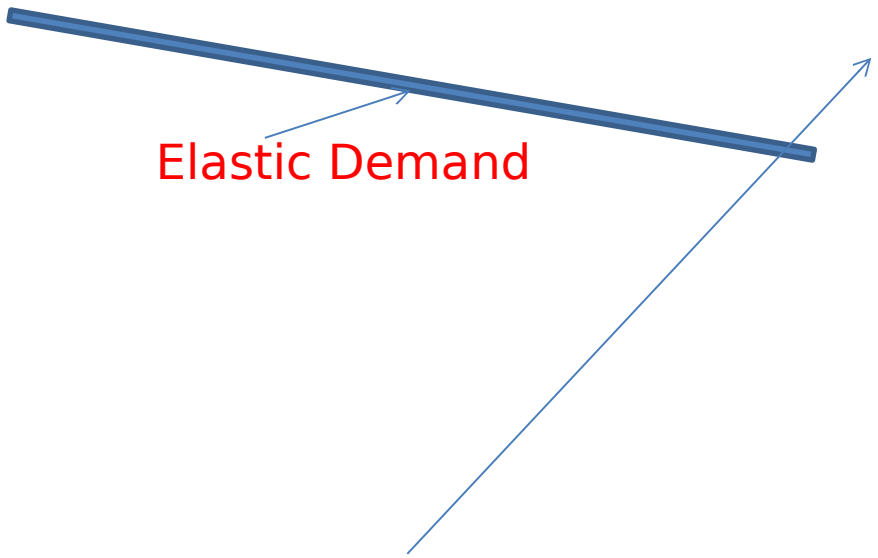
.3...Demand Schedule of Appels

[Price decreases by 20 % and Demand increases by 20%]

Price Per KG [Rupees]	Demand [KG]
400	5
333	6
278	7
231	9
193	10
161	12
134	15
112	18
93	21
78	26
65	31
54	37
45	45
37	53
31	64



..3. Elastic Demand



…3. ELASTICITY OF DEMAND-LINEAR DEMAND EQUATION

Qd= a-bP

Qd= 10-2P

From the *Demand equation* the elasticity can be measured using following formula:

The slope of the equation multiplied by the ratio of Price a(P) and quantity demanded (Qd) (i.e (P/Q)as shown blow

Point Elasticity = -bXP/Q

Point Elasticity = -2XP/Q If Price Rs.3 the associated Q will be 4 and :

Point Elasticity = -2X3/4 =-1.5 [>1]

[Note: PRICE ELACTICITY WILL ALWAYS BE NEGATIVE EVEN IF SIGN IS NIT MENTIONED]

WHY?

5. ELASTICITY OF DEMAND & REVENUE/EXPENDITURE

- **Whether total revenue increases or decreases depends on how responsive the quantity demanded is to a change in price. For this purpose we need a measure of the responsiveness of the quantity demanded to price holding other things constant. This is known as *price elasticity of demand* .**
- ***The price elasticity of demand is the percentage change in the quantity demanded of a good divided by the percentage change in its price.***

Elasticity of Demand

CASE	Price Per Unit	Demand	Change in Price	Change in Demand	Elasticity
	100	100			
A	200	80	100	-20	-0.3
	100	100			
B	150	66.7	50	-33.3	-1.0
	100	100			
C	120	50	20	-50	-3.7

Elasticity of Demand and Revenue/Expenditure

CASE	Price Per Per Unit (Rs.)	Demand	Reve/Exp	Elasticity
A	100	100	10000	-0.3
	200	80	16000	
B	100	100	10000	-1.0
	150	66.7	10000	
C	100	100	10000	-3.7
	120	50	6000	

6. Determinants of Elasticity of Demand

1. **The Availability of Substitutes:**

   If a product has reliable substitutes in the market, its demand undergoes a significant change. The more substitutes available, the more elastic the demand for the good or service will be

2. **The Proportion of Income Spent on Commodities:**

   One of the vital factors affecting price elasticity of demand is the proportion of a consumer's income that is spent on an item. For high-income households/consumers, the elasticity of demand is typically low but remains quite high for low-income-level groups.

3. **The Time Frame:**

   The Time Frame refers to the pace at which the demand reacts to the change in price. Simply, the pace at which consumers can switch to another alternative. In the short term, buyers tend to stick to the same item, fail to find substitutes, leading to the product’s inelastic demand. However, in the long term, consumers may be able to find substitutes or adjust their consumption habits, leading to more elastic demand.

…(6) Determinants of Elasticity of Demand

4. The Degree of Necessity:

Necessities, such as food and housing, tend to have inelastic demand as consumers will continue to purchase them regardless of price changes because there is normally no other good substitute On the other hand, luxury goods, such as designer clothing and high-end cars, tend to have more elastic demand because consumers are more likely to cut back on purchases when prices increase.

5. Brand Loyalty:

Brand loyalty can also affect the price elasticity of demand. Consumers who are loyal to a particular brand may be less likely to switch to substitutes, even if prices increase, leading to inelastic demand.

…(4) Determinants of Elasticity of Demand

6. The Level of Competition:

In a market with high levels of competition, firms will have to be more responsive to changes in consumer demand, leading to more elastic demand. On the other hand, in a market with less competition, firms are able to charge higher prices without losing as many customers due to the commodities' inelastic demand.

7. The Availability of Information:

The availability of information about a good or service is another factor influencing price elasticity of demand. When consumers have access to more information about a good or service,

7. Income Elasticity of Demand

- **Income elasticity of measures the responsiveness of quantity demand to a change in income. The income elasticity of demand is the percentage change in quantity demanded divided by the percentage change in income, as follows:**

$$[\%\Delta Q / Q] \div [\%\Delta Y / Y]$$

WHERE Q and Y stand for Quantity Demanded and Income

- **For most products, the income elasticity of demand is positive: that is, a rise in income will cause an increase in the quantity demanded. These goods are referred to as normal goods. However, for a few goods, with an increase in income purchase might decline; and the income elasticity of demand is negative, Such good are called inferior good.**

8.CROSS ELASTICITY

- **Cross price elasticity of demand measures the responsiveness of quantity demanded for good A to the change in the price of good B. This applies in case of Substitutes and Complementary Demand. While for substitute the sign is positive with Complementary products the sign is negative.**

[°*Qx*/ *Qx*]÷[°PY/PY]

WHERE QX and PY stand for Quantity Demanded of good X and Price per unit of goodY

9.CONSUMER SURPLUS

AS discussed, demand is the function that gives the number of units purchased as a function of the price. For an individual the difference between his/her willingness to pay and the amount he /she actually pays is known as consumer surplus. In other words Consumer Surplus is the value in Rupees of a good minus the actual price paid.

The Consumer Surplus for the full Market Demand Curve could be estimated by deducting the actual price paid from the price at which the total demand becomes ZERO, multiplied by the Quantity purchased. (See Next Slide)

The Consumer Surplus for the full Market Demand Curve could be estimated by deducting the actual price paid from the price at which the total demand becomes ZERO, multiplied by the Quantity purchased (as below):

Consumer Surplus = PDz-MP)XQd]/2

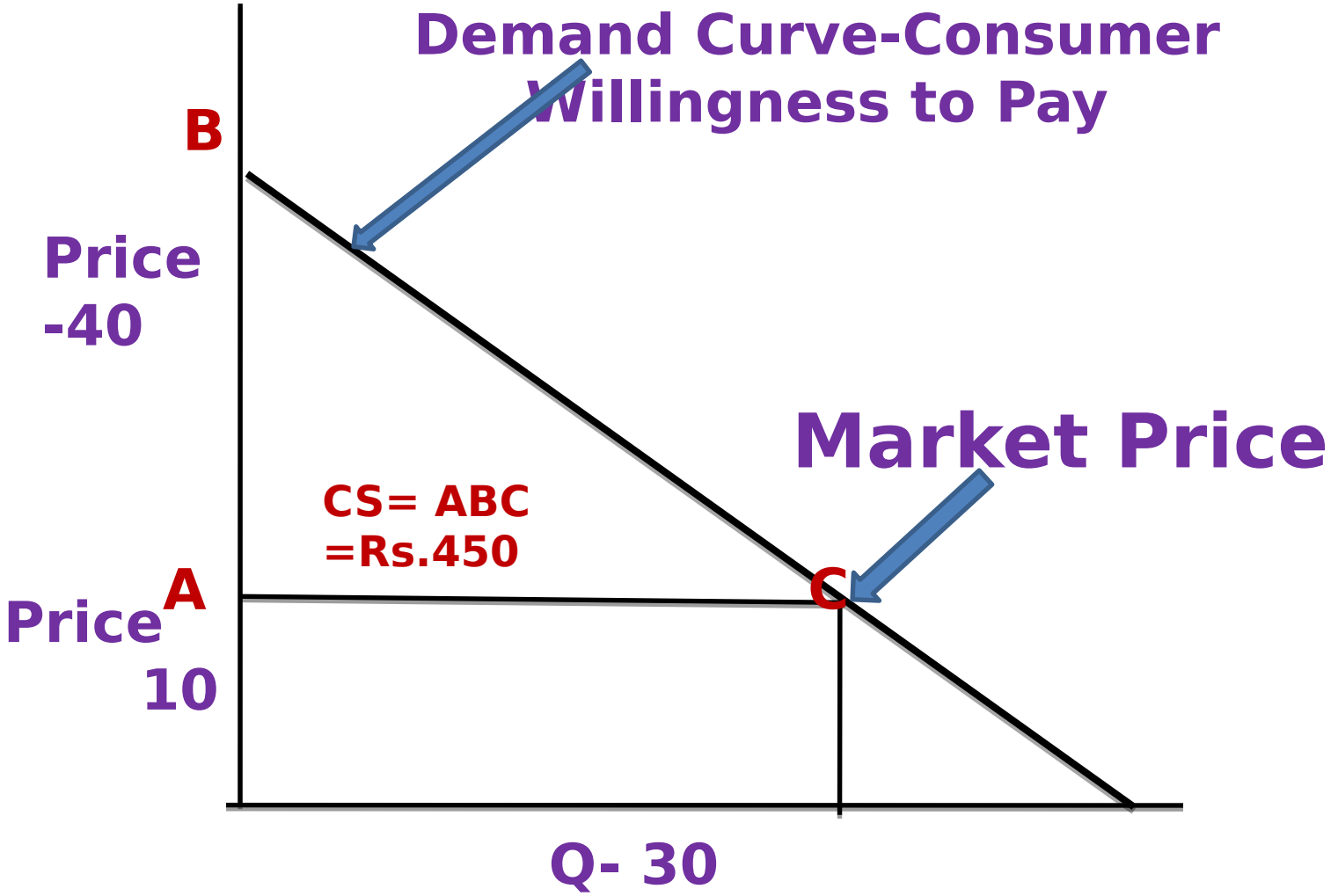
Where:

PDz = Price at which demand is ZERO

MP = Actual Market Price

(See Figure at Next Slide)

….7. CONSUMER SURPLUS



Consumer Surplus = [(40-10)X30]/2= Rs.450