ELASTICITY: A MEASURE OF THE RESPONSIVENESS OF QUANTITY DEMANDED OR QUANTITY SUPPLIED TO ONE OF ITS DETERMINANTS (EX: ITS OWN PRICE, INCOME, PRICE OF RELATED GOODS)

IN GENERAL,

(CONSEQUENCE)

$$E = \frac{\% \Delta Y}{\% \Delta X}$$

→ PERCENTAGE CHANGE IN Y

→ PERCENTAGE CHANGE IN X

(CAUSE)

IN CONTEXT OF DEMAND:

PRICE ELASTICITY OF DEMAND

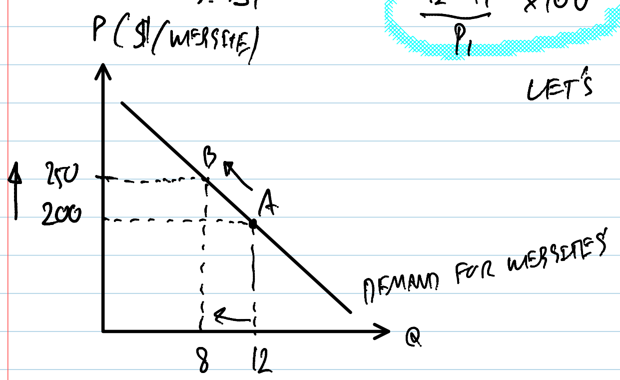
$$E^P = \frac{\% \Delta Q^D_X}{\% \Delta P_X}$$

PERCENTAGE CHANGE IN QUANTITY DEMANDED FOR GOOD X

PERCENTAGE CHANGE IN PRICE OF GOOD X

FACT #1 E^P IS A NEGATIVE NUMBER AND UNIT FREE.

$$E^P = \frac{\% \Delta Q}{\% \Delta P} = \frac{\frac{Q_2 - Q_1}{Q_1} \times 100}{\frac{P_2 - P_1}{P_1} \times 100}$$



LET'S CALCULATE E^P:

$$E^P = \frac{\frac{8-12}{12} \times 100}{\frac{250-200}{200} \times 100}$$

$$= \frac{\frac{-4}{12} \times 100}{\frac{50}{200} \times 100}$$

$$= \frac{-\frac{1}{3} \times 100}{\frac{1}{4} \times 100}$$

$$= \frac{-33.33\%}{+25\%}$$

$E^P = -1.33$ OR $|E^P| = 1.33$

$E^P = -1.33$ IMPLIES THAT

IF PRICE INCREASES BY 1%, QUANTITY DEMANDED WILL DECREASES BY MORE THAN 1%, HERE IS 1.33%.

OR IF PRICE INCREASES BY 10% , QUANTITY DEMANDED WILL DECREASES BY 13.3%

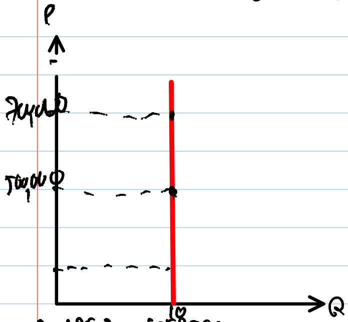
Q: WHY DO WE HAVE TO TALK ABOUT PERCENTAGE CHANGE, NOT ABSOLUTE CHANGE ?

A: CONSIDER TWO GOODS: TOOTHPICK VS FERRARI

SUPPOSE PRICES OF THE TWO GOODS FALL BY 10 BAHT.

EVEN THOUGH $\Delta P = 10$ BAHT , BUT $\%\Delta P$ IS QUITE DIFFERENT.

FACT #2 THERE ARE 5 CASES FOR PRICE ELASTICITY OF DEMAND

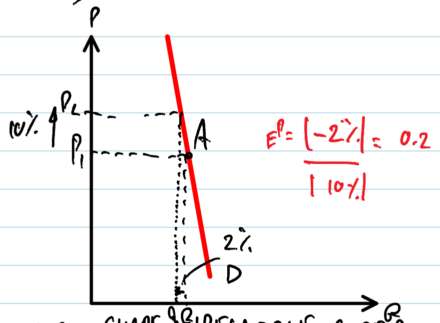


SHAPE: VERTICAL DEMAND CURVE

E^P: $E^P = \frac{\%\Delta Q}{\%\Delta P} = \frac{0}{\%} = 0$

MEANING: DEMAND IS PERFECTLY INELASTIC

[CONSUMERS PAY NO ATTENTION ON PRICE!]

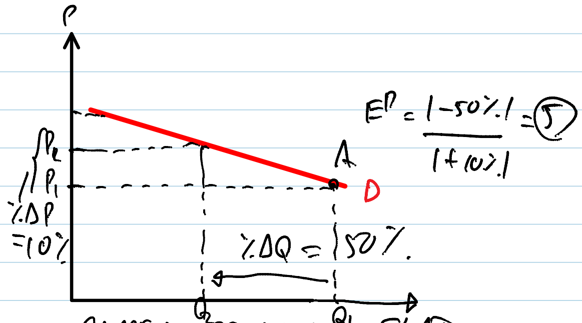


SHAPE: RELATIVE STEEP

E^P: $|E^P| = \left|\frac{\%\Delta Q}{\%\Delta P}\right| < 1$

MEANING: DEMAND IS PRICE-INELASTIC

[CONSUMERS DO NOT RESPOND MUCH TO A CHANGE IN PRICE]

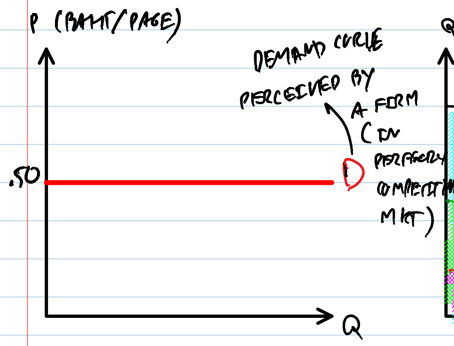


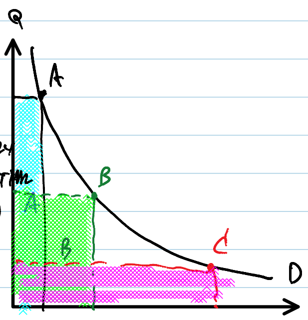
SHAPE: RELATIVELY FLAT

E^P: $|E^P| = \left|\frac{\%\Delta Q}{\%\Delta P}\right| > 1$

MEANING: DEMAND IS PRICE-ELASTIC.

(CONSUMERS DO RESPOND TO A CHANGE IN PRICE)





SHAPE: HORIZONTAL DEMAND CURVE

E^P: $|E^P| = \infty$ (INFINITY)

MEANING: DEMAND IS PERFECTLY ELASTIC

[CONSUMERS ARE EXTREMELY SENSITIVE TO A CHANGE IN PRICE.]

SHAPE: RECTANGULAR HYPERBOLA

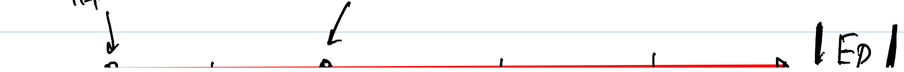
E^P: $|E^P| = 1$

MEANING: DEMAND IS UNIT-ELASTIC.

EX: 10% CHANGE IN P → 10% CHANGE IN Q^D

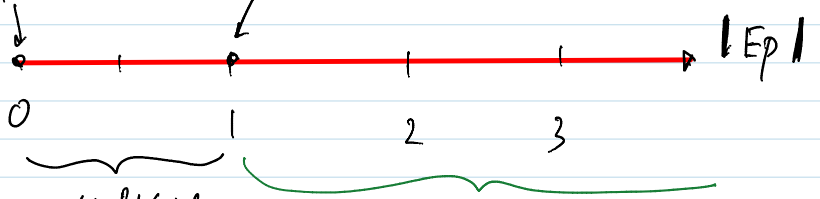
$|E_P| = 0$: DEMAND IS PERFECTLY INELASTIC

$|E^P| = 1$: UNIT-ELASTIC DEMAND



$|E| = \infty$:

$|E_p|=0$: ... $|E^p|=1$; UNIT-ELASTIC DEMAND

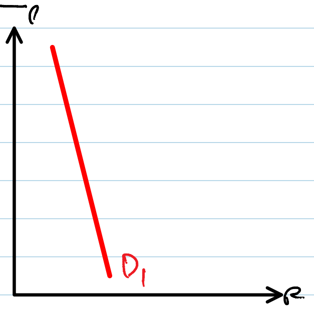


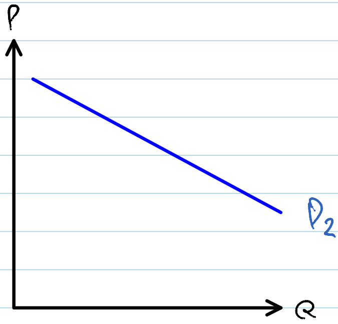
$|E|=\infty$: DEMAND IS PERFECTLY ELASTIC.

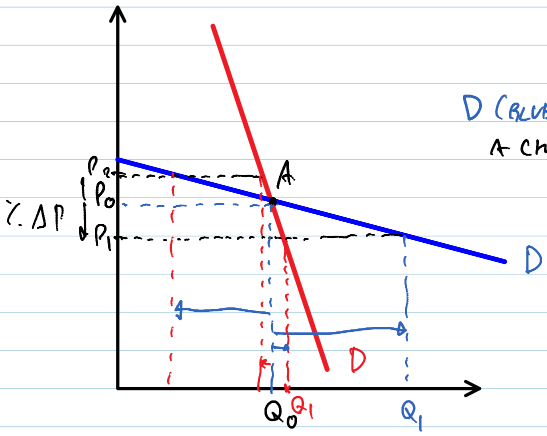
$0<|E^p|<1$: DEMAND IS PRICE-INELASTIC

$|E^p|>1$: DEMAND IS PRICE-ELASTIC.

APPLICATION

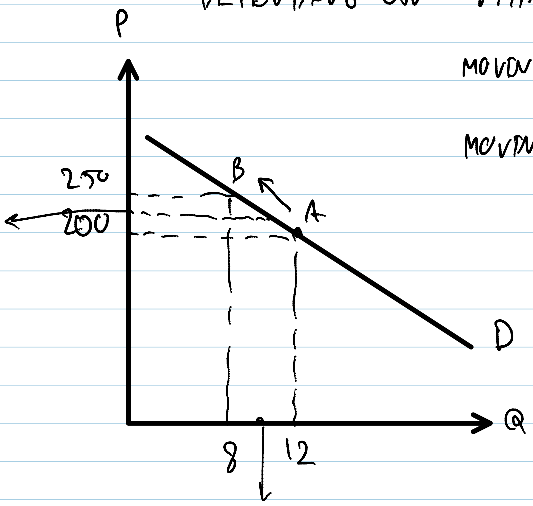






D (BLUE) IS MORE SENSITIVE TO A CHANGE IN PRICE COMPARED TO D (RED)

FACT #3 PRICE ELASTICITY OF DEMAND IS DIFFERENT, DEPENDING ON WHERE YOU START.



MOVING FROM A → B : $E^P = -1.33$ OR $|E^P| = 1.33$

DEMAND IS PRICE-ELASTIC

MOVING FROM B → A :

$$E^P = \frac{\%\Delta Q}{\%\Delta P}$$

$$\%\Delta Q = \frac{12-8}{8} \times 100 = \frac{4}{8} \times 100 = 50\%$$

$$\%\Delta P = \frac{200-250}{250} \times 100 = \frac{-50}{250} \times 100 = -20\%$$

$$E^P = \frac{+50}{-20} = -2.5 \quad \text{OR } |E^P| = 2.5$$

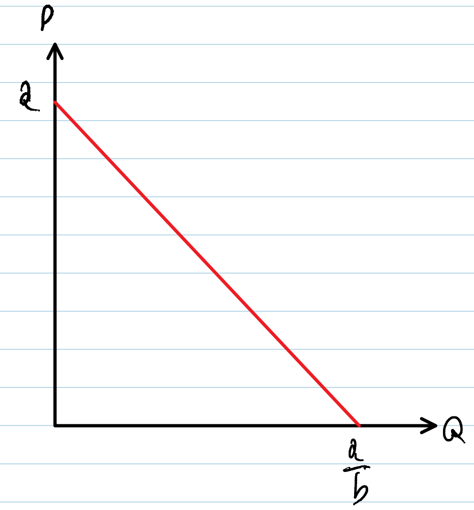
TO REMOVE THIS PROBLEM, WE USE MID POINT APPROACH

$$E^P \quad \%\Delta Q \qquad \frac{Q_2 - Q_1}{\ldots} \times 100$$

$$E^P = \frac{\%\Delta Q}{\%\Delta P} = \frac{\dfrac{Q_2 - Q_1}{\left(\frac{Q_1+Q_2}{2}\right)} \times 100}{\dfrac{P_2 - P_1}{\left(\frac{P_1+P_2}{2}\right)} \times 100}$$

$E^P = ?$

PRICE ELASTICITY OF DEMAND ALONG A LINEAR DEMAND CURVE



CONSIDER $P = f(Q)$. INVERSE DEMAND FUNCTION

SUPPOSE $P = a - bQ$

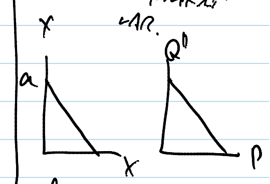
a: INTERCEPT Y-AXIS

$-b$: SLOPE

DEPENDENT VAR.

$Q^D = f(P)$

INDEPENDENT VAR.



$Y = f(X)$

$Y = a + (b)X$

a: INTERCEPT, b: SLOPE

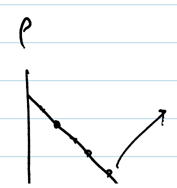
$$\text{SLOPE} = \frac{\Delta P}{\Delta Q} = -b$$

OR

$$\text{SLOPE} = \frac{dP}{dQ} = -b$$

$$E' = \frac{\%\Delta Q}{\%\Delta P} = \frac{\dfrac{Q_2 - Q_1}{Q_1} \times \cancel{100}}{\dfrac{P_2 - P_1}{P_1} \times \cancel{100}} = \frac{\dfrac{\Delta Q}{Q}}{\dfrac{\Delta P}{P}} = \frac{\Delta Q}{Q} \times \frac{P}{\Delta Q} = \boxed{\left(\frac{\Delta Q}{\Delta P}\right) \times \frac{P}{Q}}$$

SINCE $\frac{\Delta P}{\Delta Q} = \text{SLOPE}$, THE $\frac{\Delta Q}{\Delta P} = \frac{1}{\text{SLOPE}}$

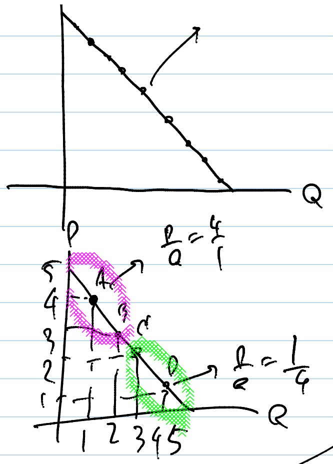


$$\boxed{E = \frac{1}{\ldots} \cdot \frac{P}{\ldots}} \; *$$

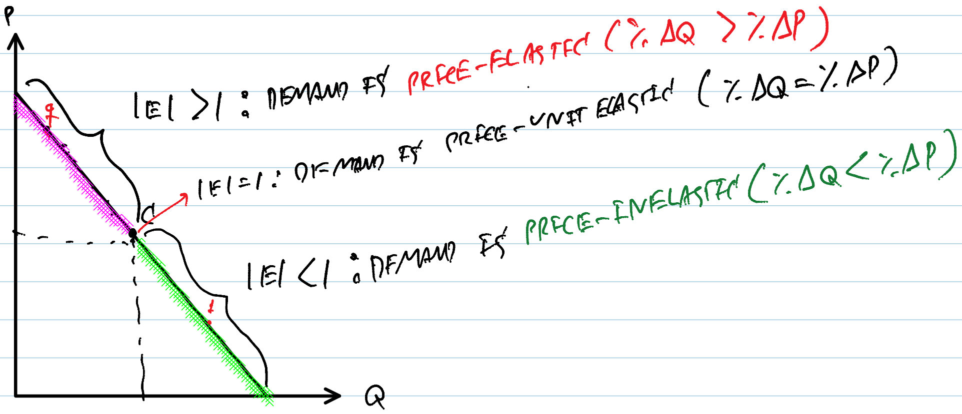
$$\boxed{E = \frac{1}{\text{SLOPE}} \cdot \frac{P}{Q}} \; *$$

CONSTANT

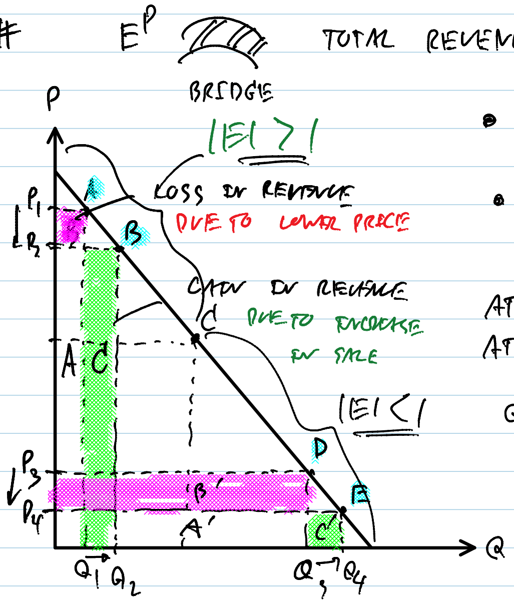
ΔQ ΔQ SLOPE



THIS FORMULA IMPLIES THAT " PRICE ELASTICITY OF DEMAND VARIES ALONG THE DEMAND CURVE.



E^P BRIDGE TOTAL REVENUE OF A FIRM



C > B

GAIN   LOSS

- TOTAL REVENUE (TR) = PRICE (P) × QUANTITY SOLD (Q)
- $|E^P|$ > 1, $= 1$, < 1

AT $P = P_1$, $TR_1 = P_1 \times Q_1$

AT $P = P_2$, $TR_2 = P_2 \times Q_2$

Q: $TR_2 > TR_1$?

$TR_1 = A + B$

$TR_2 = A + C'$

$\Delta TR = TR_2 - TR_1$
(NEW) (OLD)

$= (A + C') - (A + B)$

$= \cancel{A} + C' - \cancel{A} - B$

$\Delta TR = C' - B > 0$

SO TR INCREASES !

- WHEN DEMAND IS PRICE-ELASTIC $[|E| > 1]$, A PRICE REDUCTION STRATEGY LEADS TO AN INCREASE IN TOTAL REVENUE. :)

• WHEN DEMAND IS PRICE-ELASTIC [|E|>1], A PRICE REDUCTION STRATEGY LEADS TO AN INCREASE IN TOTAL REVENUE.

(FAVORABLE OUTCOME)

• WHEN DEMAND IS PRICE-INELASTIC [|E|<1], A PRICE REDUCTION STRATEGY LEADS TO A DECREASE IN TOTAL REVENUE.

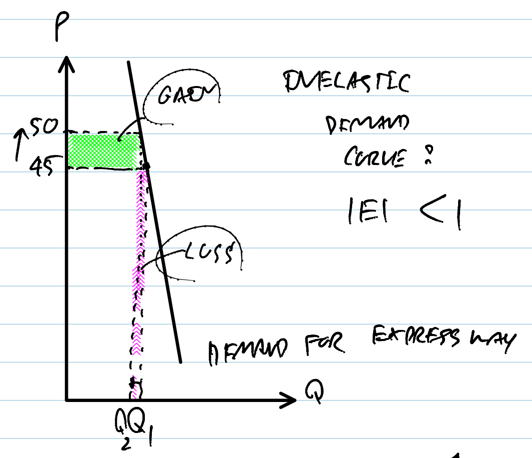
(UNFAVORABLE OUTCOME)

• WHEN DEMAND IS PRICE-INELASTIC, AN INCREASE IN PRICE LEADS TO A HIGHER REVENUE.

(THINK ABOUT WHEN P ↑ FROM P_4 TO P_3)

• WHEN DEMAND IS PRICE-ELASTIC, AN INCREASE IN PRICE LEADS TO A LOWER REVENUE.

(THINK ABOUT WHEN P ↑ FROM P_2 TO P_1)



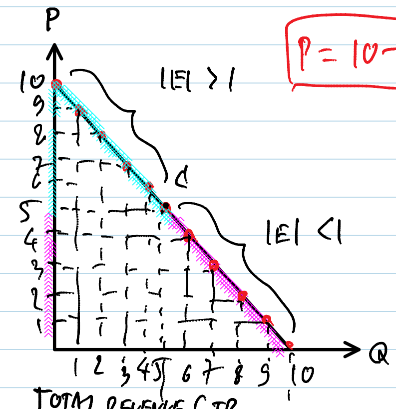
INELASTIC DEMAND CURVE:

$|E| < 1$

GAIN > LOSS → TR ↑

GIVEN THE SAME TC, π (profit) ↑

$\boxed{P = 10 - Q}$

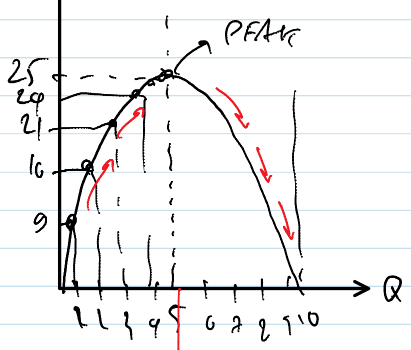


P	Q^D	TR
0	10	0
1	9	9
2	8	16
3	7	21
4	6	24
5	5	25
6	4	24
7	3	21
8	2	16
9	1	9
10	0	0

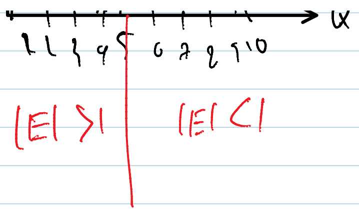
DEMAND IS INELASTIC.

DEMAND IS PRICE-ELASTIC

TOTAL REVENUE (TR)



$|E| > 1$ | $|E| < 1$



$|E| > 1$ $|E| < 1$