Price elasticity of demand (PED) [% change in demand /% change in price**]** **[**(Q2-Q1/)/(Q1+Q2)/2]/ [(P2-P1)/(P1+P2)/2]

1. A local council raises the price of car parking from £3 per day to £5 per day and finds that usage of car parks contracts from 1,200 cars a day to 900 cars per day. Calculate the price elasticity of demand for this price change.

Answer:

Q1= 1200, Q2= 900

P1=3, P2=5

% change in price = (5-3)/(5+3)/2 = (+) ½

% change in demand = (900-1200)/(900+1200)/2 = (-) 2/7

PED = % change in demand /% change in price = -(2/7)/(½)

= 0.571 (i.e. demand is **price inelastic**)

Total expenditure [price x quantity demanded**]**

2. A family's demand for cereal boxes decreases from 12 to 10 boxes when price increases from $4 to $8 per box. Calculate and comment on the change in the total expenditure of the family.

Answer:
Q1= 12, Q2 = 10: Change in demand= 10-12= 2
P1= $4, P2= $ 8: Change in price= 8-4= 4
TE1= Q1XP1= 12X4= $48
TE2= Q2XP2= 10X8= $80.
Change in TE= 80-48= $ 32
There was an insignificant change in the demand (cereal has price inelastic demand), while the total expenditure increased substantially.

Total revenue [price x quantity sold**]**

3. Refer back to Question 2, will an increase in price of cereal boxes be profitable to cereal suppliers?

Answer:
Yes, an increase in the price of cereal boxes will be profitable to cereal producers/suppliers. There was an insignificant change in the demand (cereal has price inelastic demand), while the total expenditure increased substantially. Thus, the total revenue will increase for cereal suppliers.

Income elasticity of demand (YED) [% change in QD/ % change in Y**]**

Normal goods have a positive YED (as income increases, the quantity demanded increases).

Inferior goods have a negative YED (as income increases, the quantity demanded decreases).

4. Consider a local car dealership that gathers data on changes in demand and consumer income for its cars for a particular year. When the income of its customers falls from $50,000 to $40,000, the demand for its cars falls from 10,000 to 5,000 units sold. Calculate the income elasticity of demand.

Answer:
Q1= 10,000, Q2= 5,000: % change in QD= -2/3
Y1= $50,000, Y2= $40,000: % change in Y= -2/9
YED= % change in QD/ % change in Y=(⅔)/(2/9)= 3
This produces an elasticity of 3 (normal good).

Cross elasticity of demand (XED)

Complementary goods have a negative XED (as the price of one good increases, the demand for the second good decreases).

Substitute goods have a positive XED (as the price of one good increases, the demand for the other good increases).

5. A fall in the price of X from $12 to $8 causes an increase in the quantity of Y demanded from 900 to 1,100 units. What is the cross elasticity of demand between X and Y? What type of goods X and Y are? (Substitute or Complementary)

Answer:
A) 2
B) -0.5
C) -2
D) 0.5
P1(X)= $12, P2(X)= $8: % change in price of X= -2/5
Q1(Y)= 900, Q2(Y)= 1100: % change in QD of Y= 1/5
XED= % change in QD of Y/ % change in price of X= (⅕)/(-⅖) = -0.5 (complementary good)

Price elasticity of supply (PES) [% change in QS/ % change in price**]**

6. Calculate price elasticity of supply using the following information.

Price of computer	Quantity of computers supplied
$1,100	12,000
$900	8,000

Answer:
Q1= 12,000, Q2= 8,000: % change in QS= -2/5
P1= $1,100, P2= $900: % change in price= -1/5
PES= % change in QS/ % change in price= (⅖)/(⅕) = 2 (i.e., supply is **price elastic**)

Factors affecting PED

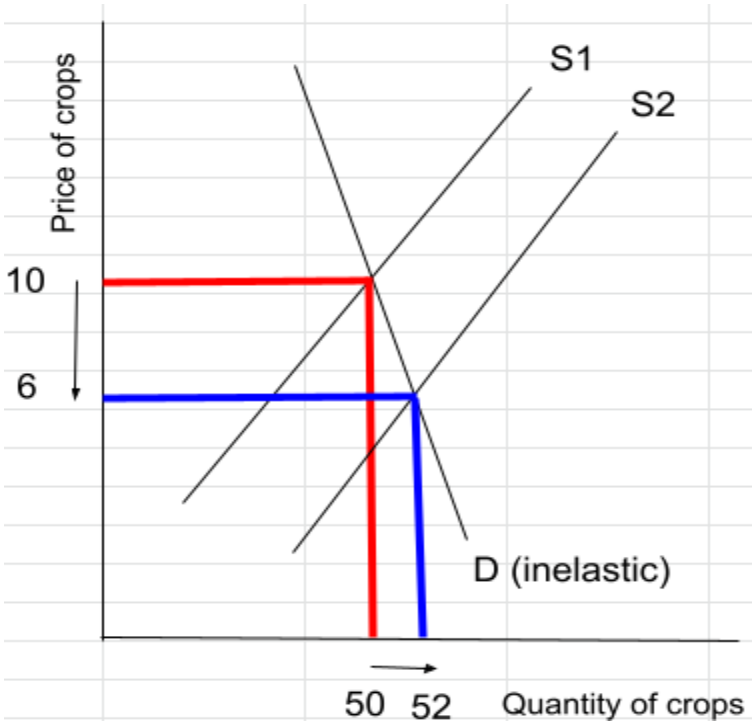
7. The demand for a good is elastic if
   A) a decrease in its price results in a decrease in total revenue. (for goods with elastic demand, when price decreases, their demand increases, and that results in an increase in TR)
   B) the good is a necessity. (necessary goods have inelastic demand)
   C) an increase in its price results in an increase in total revenue.(decrease in TR)
   D) **an increase in its price results in a decrease in total revenue**.
   P1= 2, P2= 4
   QD1= 90, QD2= 10
   PED= (8/5)/(⅔)= 2.4
   TR1= 2X90= 180, TR2= 4X10= 40
   Change in TR = 180-40 = 140 (falls)

8. The more substitutes available for a product,
   A) the larger is its income elasticity of demand.
   B) the smaller is its income elasticity of demand.
   C) the smaller is its price elasticity of demand.
   D) **the larger is its price elasticity of demand.** (more elastic PED)

9. Of the following, demand is likely to be the least elastic for
   A) pink grapefruit.
   B) iceberg lettuce.
   C) **insulin for diabetics.**
   D) diamonds

Factors affecting PES

10. If demand for farm crops is inelastic, a good harvest will cause farm revenues to
    A) increase because of the increase in the quantity that farmers can sell.
    B) increase because of a downward movement along the supply curve, encouraging an increase in demand.
    C) **decrease because of a percentage fall in price greater than the percentage increase in quantity sold.**
    D) remain unchanged, because the increase in quantity that can be sold will be matched by an equal decrease in price.



percentage fall in price= (6-10)/(6+10)/2= -50%
percentage increase in quantity sold= (52-50)/(52+50)/2= 4%
percentage fall in price greater than the percentage increase in quantity sold
TR1= 10X50= 500
TR2= 6X52= 312
TR decreases= 500-312= 188

Miscellaneous

11. If a fall in the price of good A increases the quantity demanded of good B,
    A) A and B are substitutes.
    B) **A and B are complements.**
    C) B is a substitute for A, but A is a complement to B.
    D) A is a substitute for B, but B is a complement to A.

12. A rise in the price of a product lowers the total revenue from the product if the
    A) good is an inferior product.
    B) demand for the product is inelastic.
    C) **demand for the product is elastic.**
    D) income elasticity of demand exceeds 1.

13. The increase in the demand for widgets is caused by an increase in average incomes. Therefore, widgets
    A) **are a normal good.**
    B) are elastically demanded.
    C) are an inferior good.
    D) are inelastically demanded.

14. The increase in the demand for widgets is caused by a decrease in the price of device B. Therefore,
    A) widgets and McBoover devices are substitutes.
    B) widgets are a normal good.
    C) McBoover devices are a normal good.
    D) **widgets and device B are complements**

15. Goods whose income elasticities are negative are called
    A) superior goods.
    B) **inferior goods**.
    C) normal goods.
    D) complements

16. For which product is the income elasticity of demand most likely to be negative?
    A) computer software
    B) **used clothing**
    C) basketballs
    D) bread

17. $P_S = 20 + 4Q_S$

    $P_D = 40 - Q_D$

The market is at **equilibrium**.
Government imposes a regulation that the price must be at 30 BDT.
Which group (consumers or suppliers) were more responsive/ sensitive to this change?

Answer:
Steps to solve this question-

1. Find the equilibrium price and quantity from the given equations
2. Find the new QD and QS at P=30
3. Find PED and PES
4. Compare and comment.

We know that at equilibrium,
PS= PD= P*
QS= QD= Q*
20+4Q*= 40-Q*
4Q*+Q*= 40-20
5Q*= 20
Q*= 4
P*= 20+4*4= 36
Therefore, **at equilibrium, Q*= 4 and P* = 36**

Rearrange the 2 equations to find new QD and QS.
At P=30,
QD=40-PD= 40-30= 10
QS= (PS-20)/4= (30-20)/4= 2.5
New QD= 10 and QS= 2.5

QD1= 4, QD2= 10: % change in QD= + 6/7
QS1= 4, QS2= 2.5: % change in QS= - 6/13
P1= 36, P2= 30: % change in P= - 2/11

PED= % change in QD/ % change in P= (6/7)/(2/11)= 4.71
PES= % change in QS/ % change in P= (6/13)/(2/11)= 2.54

The value we get for PED is greater than PES, hence we can conclude that consumers were more responsive/sensitive to the price change.

Note: All these problems have been taken from external sources.