**Solution (Assignment 3)**

**A/ problems**

**Problem 1**

Use the diagram to answer the following questions:

Price ($)/pair

A

90

75

B

C

60

D

45

E

30

F

15

300

250

200

150

100

50

Shoes sales/week

0

a) Calculate the PED (and interpret the results) between points A and B; C and D; and E and F.

b) Suppose that the current price charged by the store is $75/pair. What will happen to the store’s total revenue from sales (P × Q) if it increases the price to $90/pair? Repeat the calculations assuming that the initial price is $45/pair and that the store increases it to $60. Repeat the calculations if the price is increased from $15/pair to $30/pair.

c) Explain why the answers to a) can be used to predict answers to b).

a) Using the midpoint formula, The PED between points A and B is given by:

[ΔQ/(1/2(QF + QI)) × 100%] ÷ [ΔP/(1/2(PF + PI)) × 100%] =

[(QF – QI)/(1/2(QF + QI)) × 100%] ÷ [(PF – PI)/(1/2(PF + PI)) × 100% ]

Where QF = 100; QI = 50; PF = 75; PI = 90 🡺 Using these figures we first compute the value of the numerator, before computing the value of the denominator:

The numerator is equal to: (100 – 50)/(1/2(100 + 50)) × 100% = 50/75 × 100% = 66.7%

The denominator is equal to: (75 – 90)/(1/2(90 + 75)) × 100% = -15/82.5 × 100% = -18.2%

The PED is thus equal to: -(66.7/18.2) = - 3.66

*Conclusion*: between the price range (90-75), the demand for shoes is **elastic**

The PED between points C and D is equal to the ratio:

[(QF – QI)/(1/2(QF + QI)) × 100%] ÷ [(PF – PI)/(1/2(PF + PI)) × 100% ]

Where QF = 200; QI = 150; PF = 45; PI = 60 🡺 Using these figures we first compute the value of the numerator, before computing the value of the denominator:

The numerator is equal to: (200 – 150)/(1/2(200 + 150)) × 100% = 50/175 × 100% = 28.6%

The denominator is equal to: (45 – 60)/(1/2(45 + 60)) × 100% = -15/52.5 × 100% = -28.6%

The PED is thus equal to: -(28.6/28.6) = -1

*Conclusion*: between the price range (60-45), the demand is **unitarily elastic**

The PED between points E and F is equal to the ratio:

[(QF – QI)/(1/2(QF + QI)) × 100%] ÷ [(PF – PI)/(1/2(PF + PI)) × 100% ]

Where QF = 300; QI = 250; PF = 15; PI = 30 🡺 Using these figures we first compute the value of the numerator, before computing the value of the denominator:

The numerator is equal to: (300 – 250)/(1/2(300 + 250)) × 100% = 50/275 × 100% = 18.2%

The denominator is equal to: (15 – 30)/(1/2(15 + 30)) × 100% = -15/22.5 × 100% = -66.7%

The PED is thus equal to: -(18.2/66.7) = - 0.27

*Conclusion*: between the price range (30-15), the demand is **inelastic**

 b) The total revenue (TR) is the $value of total sales 🡺 P × Q 🡺

1) The TR when the price is $75: 75 × 100 = $7500

The TR when the price increases to $90: 90 × 50 = $4500 🡺 the TR decreases by $3000 when the price increases from $75 to $90

2) The TR when the price is $45: 45 × 200 = $9000

The TR when the price increases to $60: 60 × 150 = $9000 🡺 the TR remains the same when the price increases from $45 to $69

3) The TR when the price is $15 = 15 × 300 = $4500

The R when the price increases to $30 = 30 × 250 = $7500 🡺 the TR increases by $3000 when the price increases from $15 to $30

c)

1) When the demand is elastic (as it is in the price range (90-75)), an increase in the price will induce a substantial decrease in the quantity demanded in relative terms 🡺 the TR will decline

2) When the demand is unitarily elastic (as it is in the price range (60-45)), an increase in the price will induce a decrease in the quantity demanded of the same relative size 🡺 the TR will remain constant

3) When the demand is inelastic (as it is in the price range (30-15)), an increase in the price will induce a small decrease in the quantity demanded in relative terms 🡺 the TR will increase

**Question 2**

For each of the following scenarios decide whether you agree or disagree and explain your answer:

a) If the elasticity of demand for cocaine is -0.2 and the Drug Enforcement Administration succeeds in reducing supply substantially, causing the street price of the drug to rise by 50%, buyers will spend less on cocaine

b) Every Christmas, tree vendors bring tens of thousands of trees from the forests to big cities. During the last two years, the market has been very competitive: price has fallen by 10%. If the PED was -1.3, vendors would lose revenues as a result of the price decline

c) You have just bought a company that publishes cookbooks. You consult your in-house economist, Mr. Do Llar. The conversation goes like this:

Mr. Llar: “According to my calculations, the price elasticity of demand for your cookbooks is –2.4”

You: “Ok. Given what you just said, my objective is to maximize sales revenue”

Mr. Llar: “Easy! You should raise the price of the cookbooks”

You: “You are a useless collection of carbon-based molecules!”

a) Disagree → buyers will spend more. Since demand is inelastic (less than │1│), the percent decline in quantity demanded is *less* in absolute value (-0.2 × 50% = -10% = │10%│) than the percent increase in price (50%). Thus, total expenditure, P × Q, will rise.

b) Disagree → tree vendors will gain revenues. If demand for trees is elastic (–1.3), the percent increase in the quantity of trees demanded (-1.3 × (-10%) = 13%) will be *greater*, in absolute value, than the percent decrease in price (-10% = │10%│). Thus, total revenues collected by vendors (P × Q) will rise.

c) Agree (with yourself!) → an elasticity of demand of –2.4 indicates that demand is elastic. When demand is elastic an increase in price will cause total revenue to decrease. Surely Mr. Llar did not study economics at LAU!

**B/ Multiple choice questions**

**Question 5 (multiple choice questions)**

1. The supply of paracetamol increases. There is no effect on the equilibrium quantity. Demand is

(a) perfectly inelastic.

(b) elastic.

(c) inelastic.

(d) perfectly elastic.

If demand is completely unresponsive to a price change, it is perfectly inelastic—a vertical demand curve.

2. The demand for potato chips has a downward-sloping straight-line demand curve. As the price of chips increases, the price elasticity of demand

(a) becomes more elastic.

(b) becomes less elastic.

(c) remains constant—the slope of a straight line is constant.

(d) remains constant—each price increase causes an equal decrease in quantity demanded.

Slope does not give a good guide to elasticity. A general rule for a straight-line demand curve is that, as price rises, demand becomes more elastic.

3. A 10% increase in the price of video games results in a 5% decrease in the quantity of video games demanded. The price elasticity of demand is            and demand is            .

(a) –0.5; elastic

(b) –2.0; elastic

(c) –0.5; inelastic

(d) –2.0; inelastic

Options (a) and (d) are wrong—an “elastic” value must have an absolute value of more than 1 whereas an “inelastic” value must have an absolute value of less than 1. The relatively large price change prompts a relatively small quantity change—that’s inelastic

4. The cross-price elasticity of demand between Exxon gas and Havoline motor oil is –0.7. Exxon gas and Havoline motor oil are            . The cross-price elasticity of demand between Exxon gas and Chevron gas will be           .

(a) substitutes; positive

(b) substitutes; negative

(c) complements; positive

(d) complements; negative

Negative cross-price elasticity indicates that goods are complements (when the price of one good increases, the QD of the other good will decrease, and vice versa). Because Exxon and Chevron are substitutes, the cross-price elasticity will be positive (when the price of one good increases, the QD of the other good will increase, and vice versa)