FEEDBACK TUTORIAL LETTER

1ST SEMESTER 2021

Assignment 1 & 2

Intermediate Microeconomics
IMI611S
Assignment One (IMI611s)

Question 1  [20 marks]

A) \( Q = 171 - 20p + 20pb + 3pc + 2Y \)
\( Q = 171 - 20p + 20pb + 3pc + 2(100) \)
\( Q = 371 - 20P + 20pb + 3pc \)
Change in \( Q \) / change in \( Y \) = 2
Change in \( Q \) = 2
Change in \( Y \) = 2
Change in \( Q \) = 2x100 = 200  [6 marks]

B) \( Qn = b + cp, Qr = e + ap \)
\( Qw = Qn + Qr \)
\( = b + cp + e + ap \)
\( Qw = b + e + (c + a)p \)

Inverse supply function

\( Qw = b + e + (c + a)p \)
\( = Qw - b - e = (c + a)p \)

\( P = \frac{Qw-b-e}{(c+a)} \)  [6 marks]

C) \( Qd = a - bp; Qs = e + ap + ft \)
\( Qd = Qs \)
\( a - bp = e + ap + ft \)
\( a - e - ft = ap + bp \)
\( a - e - ft = p(a + b) \)
\( \frac{a - e - ft}{a + b} = \frac{p(a + b)}{a + b} \)

\( P = a - e - ft/ a + b \)
As the temperature increases, equilibrium price will fall. There’s negative relationship between temperature and equilibrium price.

\( Qd = a - bp \)
\( Qd = a - b(a - e - ft)/(a + b) \)
\( Qd = a - (ba + be + bft)/(a + b) \)  [6 marks]

As the temperature increases, equilibrium quantity will increase to. There’s positive relationship between temperature and equilibrium price.  [2 marks]
Question 2

A) Perfectly inelastic demand means that prices or quantities are fixed and are not affected by the other variable. Therefore, there will be no effect of a N$1 specific tax on equilibrium quantity, since the product or service is a necessity and people will still maintain the same demand no matter the price. As such suppliers will still supply the same quantity demanded by the consumers. On the other hand, the equilibrium price will rise by N$1. This is because the suppliers will increase their prices by the amount of tax increase and the tax burden will fall on the consumers, therefore, increasing the equilibrium price by the same tax amount. [4 marks]

B) \[ Q = 1500 - 8.5P + 14.2p_p + 0.3Y \]
\[ 1575 = 1500 - 8.5(0.55) + 14.2(0.91) + 0.3Y \]
\[ 1575 = 1500 - 4.68 + 12.92 + 0.3Y \]
\[ 1575 = 1508.24 + 0.3Y \]
\[ 1575 - 1508.24 = 0.3Y \]
\[ 66.76 = 0.3Y \]
\[ 222.53 = Y \]

Income Elasticity of demand \( \frac{\Delta Q}{\Delta Y} = 0.3 \left( \frac{222.53}{1575} \right) = 0.04 \) [6 marks]

Question 3

U(B, Z) = AB^xZ^\beta

Y = P_B B + P_Z Z
Y = B + 2Z

Marginal Utility is

\[ M_{UB} = \alpha AB^{x-1}Z^\beta \]
\[ M_{UZ} = \beta AB^xZ^{\beta-1} \]

MRS = \[ -\frac{M_{UZ}}{M_{UB}} = -\frac{\beta AB^xZ^{\beta-1}}{\alpha AB^{x-1}Z^\beta} = -\frac{\beta B}{\alpha Z} \]

\[ \frac{MU_z}{P_z} = \frac{MU_B}{P_B} \]
\[
\frac{\beta AB^\alpha Z^{\beta-1}}{2} = \frac{\alpha AB^{\alpha-1}Z^\beta}{1}
\]

\[B = 100 \frac{\alpha}{[2(\alpha + \beta)]}\]

\[Y = B + 2Z\]
\[100 = 100 \frac{\alpha}{[2(\alpha + \beta)]} + 2Z\]
\[Z = 100\beta/(\alpha + \beta)\] [10 marks]

**Question 4** [10 marks]

(a)
\[Q_d = 20 - 2P\]
\[Q = 10.5 + 0.5P\]

\[2P = 20 - Q\]
\[P = 10 - \frac{Q}{2} = 10 - 0.5Q\]

\[Q_s = 10.5 + 0.5P\]
\[Q - 10.5 = 0.5P\]
\[\frac{Q}{0.5} - \frac{10.5}{0.5} = 2Q - 21 = P\]

The new supply function after taxation will be:

\[P = 2Q - 21 + 0.07P\]
\[P - 0.07P = 2Q - 21\]

\[0.93P = \frac{2Q}{0.93} - \frac{21}{0.93}\]

\[P = 2.15Q - 22.58\]

Market equilibrium is found at the point where \(Q_d = Q_s\). Thus, to find equilibrium quantity and price, we equate the two functions:

\[Q_d = Q_s\]
\[10 - 0.5Q = 2.15Q - 22.58\]
\[ 32.58 = 2.65Q \]
\[ Q = 12.29 \text{ units} \]
\[ P = 2.15Q - 22.58 \]
\[ P = 2.15(12.29) - 22.58 \]
\[ P = 3.848 \]

The new equilibrium quantity is 12.29 units and the new equilibrium price is 3.849

(b)

\[ \text{PeD} = \frac{\% \text{ change in quantity demanded}}{\% \text{ change in price}} \]

Initial quantity and price:
\[ 10 - \frac{Q}{2} = \frac{Q}{0.5} - 21 \]
\[ 31 = 2.5Q \]
\[ Q = 12.4 \]
\[ P = 10 - \frac{12.4}{2} = 3.8 \]

\[ \% \text{ change in quantity demanded} = \frac{12.29 - 12.4}{12.4} \times 100 = -0.89\% \]
\[ \% \text{ change in price} = \frac{3.849 - 3.8}{3.8} \times 100 = 1.29\% \]

\[ \text{PeD} = \frac{-0.89}{1.29} = -0.69 \]

[10 marks]
Assignment Two [IMI611s]

Question One [25 marks]

PED = -b P/Q

-0.3 = b(850/350)

b = 0.124

Q = a - 0.124P

350 = a - 0.124 (850)

a = 445.4

Q = 455.4 - 0.124 P, demand function [5 marks]

PES = b(P/Q)

0.1 = b (850/350)

b = 0.041

Q = a + 0.041 P

350 = a + 0.041 (850)

a = 315.15

Qs = 315.15 + 0.041 P, supply function [5 marks]

Qs = 315.15 + 0.041 P + 13

Qs = 328.15 + 0.041 P, new supply function [2 marks]

New market price Qd = Qsnew

328.15 + 0.041 P = 455.4 - 0.124 P

0.165 P = 127.25

P = N$771.22 [5 marks]
Q = 359.77 [5 marks]

Existing firm reduced their production because of the reduction in market price. [3 marks]

Question Two [25 marks]

a) Average product of labour is \( Q(K, L) = \frac{10K^\alpha L^\beta}{L} \) [6 marks]

b) \( MP_L = \frac{10\beta K^\alpha L^{\beta-1}}{L} = \frac{10\beta K^\alpha L^\beta}{L} \) [4 marks]

\( MP_K = 10\alpha K^{\alpha-1} L^\beta = \frac{10\alpha K^\alpha L^\beta}{K} \) [4 marks]

\( MRTS = \frac{\frac{10\beta K^\alpha L^{\beta-1}}{10\alpha K^{\alpha-1} L^\beta}}{\frac{\beta K}{\alpha L}} \) [5 marks]

c) Constant return to scale if \( \alpha + \beta = 1 \) [2 marks]

Increasing return to scale \( \alpha + \beta > 1 \) [2 marks]

Decreasing return to scale \( \alpha + \beta < 1 \) [2 marks]

Question Three [30 marks]

a) Change in price

i) Change in \( P = P_2 - P_1 = (200 - 5Q_2) - (200 - 5Q_1) \)

\( = -5(Q_2 - Q_1) \)

\( = -5 \) since change in \( Q \) is 1 [5 marks]

ii) Change in \( Q = Q_2 - Q_1 = (40 - 0.2P_2) - (40 - 0.2P_1) \)

\( = -0.2 (-0.9) \)

\( = 0.18 \) [5 marks]

b) Marginal utility is referring to the additional utility one get from consuming one extra unit of good. If the ratios are not the same, one will be willing to consume more of the good with larger ratio. [6 marks]

c) \( D \)

i) \( 25Y + 35X = 1500 \) [3 marks]
ii)  

iii) Graph

iv) The slope will increase