1. Utility Maximization

Bob spends all of his income on pizza and ice cream. The following table shows Bob's utility for pizza and ice cream. Ice cream costs $3.00 and pizza costs $2.00 per slice, and Bob has a total of $24.00 to spend on ice cream and pizza.

Ice Cream				Pizza			
Quantity	Total Utility (TU)	Marginal Utility (MU)	$\frac{MU}{P}$	Quantity	Total Utility (TU)	Marginal Utility (MU)	$\frac{MU}{P}$
0	0	--	--	0	0	--	--
1	12	12	4.0	1	12	12	6.0
2	22	10	3.3	2	21	9	4.5
3	30	8	2.7	3	29	8	4.0
4	36	6	2.0	4	35	6	3.0
5	39	3	1.0	5	39	4	2.0
6	41	2	0.7	6	40	1	0.5
7	42	1	0.3	7	39	-1	-0.5
8	42	0	0.0	8	33	-6	-3.0

(*Hint: Read pages 290 – 294 for an insight into solving this problem*)

Using the above information:

a) Calculate Bob's marginal utility of each ice cream and the marginal utility of each pizza (*i.e. complete the MU column for ice cream and pizza*). (*3 points*)

b) Calculate Bob's marginal utility per dollar spent on ice cream and his marginal utility per dollar spent on pizza (*i.e. complete the MU/P column for ice cream and pizza*). (*3 points*)

c) Using the utility maximization condition, determine the bundle (*i.e. the combination of pizza and ice cream*) that will maximize Bob's satisfaction and calculate his total utility from this bundle. (*4 points*)

Solution:

(a) $MU = \frac{\Delta TU}{\Delta Q}$, using this formula we can calculate the

MUs for Ice cream and pizza

for example the first 2 MUs for Ice cream are

$\frac{12-0}{1-0} = \frac{12}{1} = 12$,

$\frac{22-12}{2-1} = \frac{10}{1} = 10$, and so on

until we calculate all the MUs.

(b) Given P_z = price of pizza = 2

P_I = price of ice cream = 3

we divide the MUs of the two goods by their respective prices to get $\frac{MU}{P}$ for each good.

~~XXXXXXX~~ For pizza, we have $\frac{MU_z}{P_z}$

for ice cream we have $\frac{MU_I}{P_I}$

The first two MU/p for ice cream are $\frac{12}{3} = 4$ & $\frac{10}{3} = 3.3$ and so on until we get all the MU/p's.

See the respective columns.

(c) Remember Bob only has $24 to spend, thus he cannot spend more than his income

$$\Rightarrow P_z Q_z + P_I Q_I \leq M \quad (M = \text{income}$$

Q_z = quantity of Pizza

Q_I = " " Ice Cream)

∴ Bob maximizes is satisfaction/utility

when $\frac{MU_z}{P_z} = \frac{MU_I}{P_I}$ and $P_z Q_z + P_I Q_I \leq M$

The combination that satisfies this condition is 4 ice cream and 5 pizza, this gives him a total utility of $36 + 39 = 75$ (sum of total utilities from two goods)

Q2

Elasticity
of demand

A local store that sells two main types of wine, Chardonnay and Riesling, is seeking to increase its sales revenue but does not want to lower the price of its wines for fear that it will be viewed as low quality wine. The store would like to raise the price of its wines but is not sure which wine's price it should raise. The store hires you, an Economist to advise them on the best course of action.

You are given the following information about the prices and quantities of the two wines in the past. Last time the store changed prices:

➢ **Chardonnay:** the price was increased from $10 to $12, and number of bottles demanded per week was observed to decrease from 50 to 40;

➢ **Riesling:** the price was increased from $15 to $25 a bottle and the number of bottles demanded decreased from 80 to 70 bottles a week.

Based on the above information:
a) Calculate the price elasticity of demand for Chardonnay? *(4 points)*
b) Calculate the price elasticity of demand for Riesling? *(4 points)*
c) Use your answers in a) and b) to determine which wine's price the store should increase in order to increase its sales revenue. *(2 points)*

Solution

(a) $E_d = \dfrac{Q_2 - Q_1}{\frac{1}{2}(Q_2 + Q_1)} \Big/ \dfrac{P_2 - P_1}{\frac{1}{2}(P_2 + P_1)} = \dfrac{Q_2 - Q_1}{Q_2 + Q_1} \Big/ \dfrac{P_2 - P_1}{P_2 + P_1}$

Chardonnay: $P_1 = 10, P_2 = 12$
$Q_1 = 50, Q_2 = 40,$

$\therefore E_d = \dfrac{40-50}{40+50} \Big/ \dfrac{12-10}{12+10} = \dfrac{-10}{90} \Big/ \dfrac{2}{22}$

$\therefore E_d = -\dfrac{1}{9} \times \dfrac{11}{2} = \left(\dfrac{11}{9}\right)$ or $\boxed{1.22}$ elastic

(b) Riesling: $P_1 = 15, P_2 = 25$
$Q_1 = 80, Q_2 = 70,$

$\therefore E_d = \dfrac{70-80}{70+80} \Big/ \dfrac{25-15}{25+15} = \dfrac{-10}{150} \Big/ \dfrac{10}{40}$

$\therefore E_d = -\dfrac{1}{15} \times \dfrac{4}{1} = \left(\dfrac{4}{15}\right)$ or $\boxed{0.27}$ inelastic

(c) The store should increase the price of Riesling since it is inelastic in demand (Remember relationship b/n TR & elasticity)

3. **Taxes**
The following graph shows the market for imported luxury cars. The current equilibrium price per car is $60,000, and at that price 40 imported luxury are sold weekly. In order to promote the sales of domestically produced luxury cars, government. This raises the equilibrium price to $63,000 per luxury car and reduce the equilibrium quantity to 25 luxury cars per week.
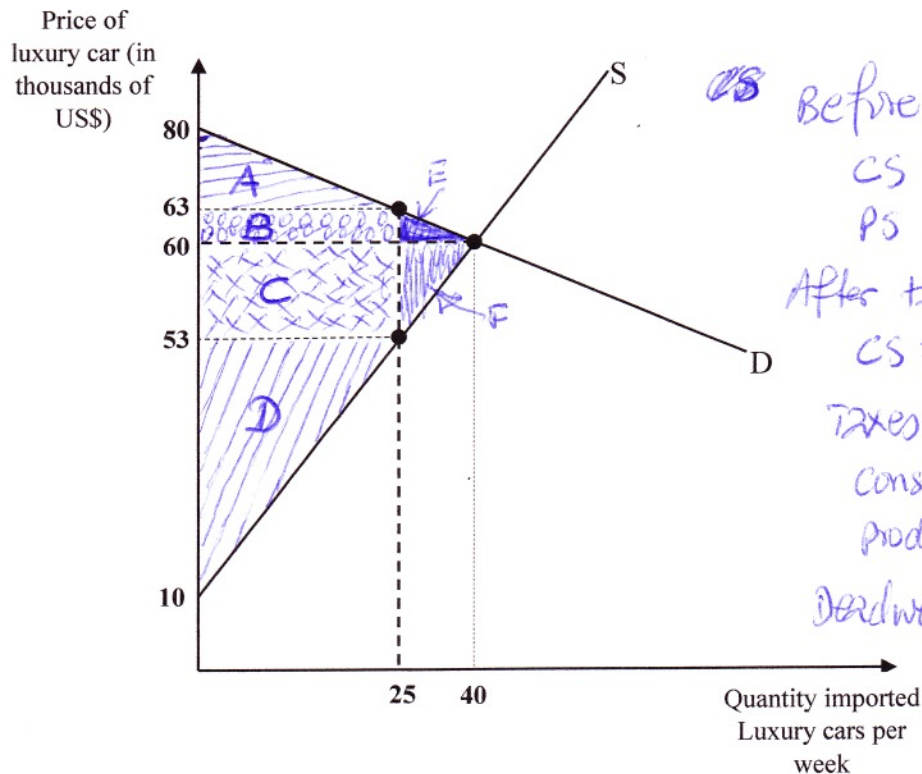
Using the information on the graph:
a) Calculate the consumer and producer surplus before government imposed taxes on the foreign luxury cars. *(3 points)*
b) After government has imposed taxes on luxury cars calculate the following:
    i.   The new consumer and producer surplus. *(3 points)*
    ii. The amount of taxes collected by government and the deadweight loss *(2 points)*
    iii. The amount of taxes paid by the consumer and the producer. Who pays more taxes and why *(2 points)*

Q3. Solution

(a) Before taxes: $CS = \frac{1}{2} \times (80-60) \times 40 = \$ 400.00$

$PS = \frac{1}{2} \times (60-10) \times 40 = \$ 1,000.00$

(b) After \$10 tax:

(i) New $CS = \frac{1}{2} \times (80-63) \times 25 = \$ 212.50$

New $PS = \frac{1}{2} \times (53-10) \times 25 = \$ 537.50$

(ii) Amount of taxes collected $= 10 \times 25 = \$ 250.00$

(iii)   Consumer pays $(63-60) \times 25 = \$ 75.00$

Producer pays $(60-53) \times 25 = \$ 175.00$

Producer pays more because supply is more inelastic than demand.

a) <u>Accounting vs. Economic Profits:</u>

Q4

Decision making by Individuals & firms.

Bill quits his job as a welder that paid him $ 35,000 a year to set up his own private welding business. He converts his garage from which he previously received a rent of $600 a month into a workshop, and spends $1,000 monthly on welding supplies. He also hires a part time assistant whom he pays $500 a month. If the monthly revenue from his welding business is $5,000.

    i.   Calculate Bill's accounting profit. *(2 points)*

    ii.   Calculate Bill's Economic Profit. *(2 points)*

b) <u>Rationality:</u>

State and discuss the three principal reasons why people might prefer a worse payoff. *(2 points for each correct reason and its explanation)*

<u>Solution:</u> Bill's ^annual costs an revenue.

Item	Annual Costs ($)	Annual Revenue ($)
1. Supplies	1,000 × 12 = 12,000	
2. Assistant's wages (labor cost)	500 × 12 = 6,000	
3. Forgone salary	35,000	
4. Forgone rent	600 × 12 = 7,200	
Total accountant's costs	18,000	5,000 × 12 = 60,000
total economist's costs	60,200	5,000 × 12 = 60,000

Note: 1 & 2 are explicit costs: ➤ sum to 18,000

60,200

3 & 4 are implicit costs: sum to 42,200

Q4 cont'd

∴ Accountant's profit = $60,000 - 18,000 = \$48,000.00$

Economist's profit = $60,000 - 60,200 = \$-200.00$

Thus the accountant arrives at a massive profit while the economist arrives at a loss. The difference is in their treatment of implicit costs (lost wages and rent).

(b) Three principles are
- Concerns about fairness
- Bounded rationality
- Risk aversion

(See pages 265-266).