B.E. International Program

Faculty of Economics, Thammasat University

EE 211 Principle of Microeconomics

Exercise 4 - Answers

(Consumers, Producers, and Market Efficiency)

1. Explain the concepts of consumer's surplus, producer's surplus, and total surplus (or social welfare).
   See lecture notes.

2. Show that total surplus is equal to the difference between consumers' willingness to pay and producers' cost. Discuss why total surplus is maximized at the market equilibrium.
   TS = CS + PS = (WTP – P) – (P – cost) = WTP – Cost.
   See lecture notes for why TS is maximized at the market equilibrium.

3. (This question is from Question 4 in Exercise 2).

Suppose that the demand and supply schedules for oysters in a local market (in 1,000 kilograms/months) are given as follows:

Price (Baht/Kg)	Quantity Demanded	Quantity Supplied
120	40	130
110	50	110
100	60	90
90	70	70
80	80	50
70	90	30
60	100	10

a. Determine the equilibrium price and quantity.
   P*= 90 and Q*=70

Note that: the function of this demand schedule is $P = 160 - Q_d$, and the function of this supply schedule is $P = 0.5Q_s + 55$.

b. Determine consumers' surplus and producers' surplus at the equilibrium.

CS = ½ * (160-90) * 70 = 2,450 baht.

PS = ½ * (90-55) * 70 = 1,225 baht.

(Try plotting the graph yourself!)

c. Suppose now consumers' average income increases. This results in an increase in quantity demanded by 30 units at any given price. Show how the equilibrium changes. Also, calculate the changes in consumers' surplus and producers' surplus.

Price (Baht/Kg)	Quantity Demanded	New Qd	Quantity Supplied
120	40	70	130
110	50	80	110
100	60	90	90
90	70	100	70
80	80	110	50
70	90	120	30
60	100	130	10

The new demand curve is $P = 190 - Q_d$.
New equilibrium: P* = 100, Q*=90.
New CS = ½ * (190-100) * 90 = 4,050 baht. ➔ ΔCS = 1,600 baht.
New PS = ½ * (100-55) * 90 = 2,025 baht. ➔ ΔPS = 800 baht.
(Try plotting the graph yourself!)

4. (This question is from Question 7 in Exercise 2).
Suppose that the demand and supply of pencils are given by $Q^D = 30 - P$ and $Q^S = P$.
   a. Determine the equilibrium price and quantity.
   Q* = 15, P*= 15

   b. From the answer in a., calculate consumer's surplus and producer's surplus.
   CS = ½* (30-15) * 15 = 112.5
   PS = ½ * (15-0) * 12 = 112.5.
   [Note: the inverse demand function is P=30-Qd, so the demand curve intersects the y-axis at P=30. Try drawing the graph to see CS and PS.]

c. Suppose the price is now fixed at $20, how do consumer's surplus and producer's surplus change? What if the fixed price is changed to $10? Show your work.

When price is fixed at $20, the quantity actually bought and sold reduces to 10 units. (there is excess supply of 10 units)

New CS = ½*(30-20)*10 = $50 ➔ ΔCS = -62.5 (Buyers are forced to pay P=20).

New PS = ½*(20+10)*10 = $150. ➔ ΔPS = 37.5 (When Q = 10 units, seller can sell at P = 10. Use the trapezoid formula to find the area of new PS.)

TS = - $25 or DWL = $25.

When price is fixed at $10, the quantity actually bought and sold reduces to 10 units. (there is excess demand of 10 units)

New CS = ½*[(30-10)+10]*10 = $150 ➔ ΔCS = 37.5 (When Q = 10 units, buyer can buy at P = 10. Use the trapezoid formula to find the area of new CS.)

New PS = ½*10*10 = $50. ➔ ΔPS = -62.5 (Sellers are forced to sell at $10).

TS = - $25 or DWL = $25.

(Try plotting the graph yourself!)