ECO241 Homework Questions: Chapter 3: Equilibrium Analysis in Economics

1. Find P* and Q* for the following model:

    Qd = a – bP

    Qs = - c +dP

    Qd = Qs

2. Find P* and Q* for the following model by (a) elimination of variables and (b) using formulas derived in Question 1.

    Qd = 24 – 2P

    Qs = -5 + 7P

    Qd = Qs

3. Find the equilibrium P* and Q* for the following model:

    $Qd = 3 – P^2$

    Qs = 6P – 4

    Qd = Qs

4. Find the equilibrium P* and Q* for the following model:

    $Qd = 8 – P^2$

    $Qs = P^2 – 2$

    Qd = Qs

5. The demand and supply functions of a two-commodity market model are as follows:

    $Q_{d1} = 18 – 3P_1 + P_2$ $Q_{d2} = 12 + P_1 – 2P_2$

    $Q_{s1} = -2 + 4P_1$ $Q_{s2} = -2 + 3P_2$

(a) Find Pi* and Qi* (i = 1, 2).

(b) Comment on the relationship between Good 1 and Good 2 (Substitute/Complement).

6. The demand and supply functions for a two-commodity market model are as follows:

    $Q_{d1} = 10 – 2P_1 + P_2$ $Q_{d2} = 20 + P_1 – P_2$

    $Q_{s1} = -5 + 6P_1$ $Q_{s2} = -2 + 4P_2$

(a) Find Pi* and Qi* (i = 1, 2).

(b) Comment on the relationship between Good 1 and Good 2 (Substitute/Complement).

7. In a two-commodity market equilibrium model, the inverse demand functions are given as

$$P_1 = Q_1^{-\frac{1}{3}} Q_2^{\frac{2}{3}}$$

$$P_2 = Q_1^{\frac{2}{3}} Q_2^{-\frac{1}{3}}$$

(a) Find the demand functions for good 1 and good 2.

(b) Give the supply functions given as follows, find Pi* and Qi* (i = 1, 2).

$$Q_1^s = \frac{1}{100} P_1$$

$$Q_2^s = P_2$$

8. Given the following model:

$$Y = C + I_0 + G_0$$
$$C = a + b(Y - T) \qquad (a > 0, 0 < b < 1) \text{ [T: taxes]}$$
$$T = d + tY \qquad (d > 0, 0 < t < 1) \text{ [t: income tax rate]}$$

(a) How many endogenous variables are there?

(b) Find Y^*, T^* and C^*.

9. Let the national income model be:

$$Y = C + I_0 + G$$
$$C = a + b(Y - T_0) \qquad (a > 0, 0 < b < 1)$$
$$G = gY \qquad (0 < g < 1)$$

(a) How many endogenous variables are there?

(b) Find Y^*, T^* and C^*.

(c) What restriction on the parameters is needed for a solution to exist?

10. Find Y^* and C^* from the following:

$$Y = C + I_0 + G_0$$
$$C = 30 + 5Y^{1/2}$$
$$I_0 = 20$$
$$G_0 = 15$$