Extra practice question

1. Find the equilibrium solution of the following model:

$$Q_d = 3 - P^2, \qquad Q_s = 6P - 4, \qquad Q_s = Q_d.$$

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

$$\begin{aligned} Q_{d1} &= 18 - 3P_1 + P_2 \qquad & Q_{d2} &= 12 + P_1 - 2P_2 \\ Q_{s1} &= -2 + 4P_1 & Q_{s2} &= -2 + 3P_2 \end{aligned}$$

Find the equilibrium of the model.

3. (The effect of a sales tax) Suppose that the government imposes a sales tax of t dollars per unit on product 1. The partial market model becomes

$$Q_1^d = D(P_1 + t), \quad Q_1^s = S(P_1), \quad Q_1^d = Q_1^s.$$

Eliminating Q_1^d and Q_1^s, the equilibrium price is determined by $D(P_1 + t) = S(P_1)$.

   (a) Identify the endogenous variables and exogenous variable(s).

   (b) Let $D(p) = 120 - P$ and $S(p) = 2P$. Calculate P_1 and Q_1 both as function of t.

   (c) If t increases, will P_1 and Q_1 increase or decrease?

4. Let the national-income model be:

$$\begin{aligned} Y &= C + I_0 + G \\ C &= a + b(Y - T_0) \qquad & (a > 0, 0 < b < 1) \\ G &= gY & (0 < g < 1) \end{aligned}$$

   (a) Identify the endogenous variables.

   (b) Give the economic meaning of the parameter g.

   (c) Find the equilibrium national income.

   (d) What restriction(s) on the parameters is needed for an economically reasonable solution to exist?

5. Find the equilibrium Y and C from the following:

$$Y = C + I_0 + G_0, \qquad C = 25 + 6Y^{1/2}, \qquad I_0 = 16, \qquad G_0 = 14.$$

6. In a 2-good market equilibrium model, the **inverse** demand functions are given by

$$P_1 = Q_1^{\frac{-2}{3}} Q_2^{\frac{1}{3}}, \quad P_2 = Q_1^{\frac{1}{3}} Q_2^{\frac{-2}{3}}.$$

   (a) Find the demand functions $Q_1 = D^1(P_1, P_2)$ and $Q_2 = D^2(P_1, P_2)$.

   (b) Suppose that the supply functions are

$$Q_1 = a^{-1}P_1, \qquad Q_2 = P_2.$$

   Find the equilibrium prices (P_1^*, P_2^*) and quantities (Q_1^*, Q_2^*) as functions of a.