MS115 Mathematics for Enterprise Computing
Tutorial Sheet 6

1. Given the demand function $Q_D = -4P + 10$, determine the minimum price at which demand equals zero.

2. Consider the following demand and supply functions of a particular good:

$$Q_D = -3P + 9 \qquad \text{and} \qquad Q_S = 2P + 4.$$

   (i) Identify the slopes and vertical intercepts of these functions.

   (ii) Sketch the graphs of these functions on the same pair of axes.

   (iii) Determine the equilibrium price and quantity of this good.

3. Determine the equilibrium price and quantity of a good whose demand are supply functions are as follows:

$$Q_D = -P + 8 \qquad \text{and} \qquad Q_S = 2P + 2.$$

4. Consider the following demand and supply functions of a particular good:

$$Q_D = -5P + 15 \qquad \text{and} \qquad Q_S = 3P + 5.$$

   (i) Determine the range of prices for which demand exceeds supply.

   (ii) Determine the range of prices for which supply exceeds demand.

5. Consider the following demand function of a particular good:

$$Q_D = -2P + 13.$$

   (i) Invert the demand function to express P as a function of Q_D.

   (ii) Express total revenue TR as a function of Q_D.

   (iii) Given a total cost function $TC = \left(\frac{1}{2}\right) Q_D + 10$, express the profit function as a quadratic function in Q_D.

   (iv) Determine the values of Q_D for which profit equals zero.