QUANTITATIVE ANALYSIS

Cost and Market Structures

1. A firm’s short-run average cost is described by the equation:
   \[ SAC = \frac{2,000}{Q} + 60 + 0.2Q. \]
   a) Determine the equation for the firm’s marginal cost.
   b) What is the MC of producing the tenth unit of output?

2. For a perfectly competitive firm, long-run average cost is:
   \[ LAC = 300 - 20Q_F + 0.5Q_F^2, \]
   where \( Q_F \) denotes the firm’s output.
   a) Determine the firm’s long-run profit-maximizing output and price.

3. A monopolist faces the demand curve
   \[ P = 100 - 2Q \]
   and has total cost of
   \[ C = 50 + 20Q \]
   a) Determine its profit-maximizing price and output.

4. The kinked demand curve in an oligopolistic market is defined by the equations:
   \[ \begin{align*}
   P &= 300 - 3Q \\
   \text{and } P &= 470 - 5Q
   \end{align*} \]
   a) Derive equations for the marginal revenue curves.
   b) Determine the price and quantity at the "kink" of the demand curve.