1. We know that total cost is:
   \[ C = (SAC)Q = 2000 + 60Q + 0.2Q^2. \]
   a) In turn, \( MC = dC/dQ = 60 + 0.4Q \).
   b) At \( Q = 10 \), it follows that \( MC \) is 64.

2. In the long run, under perfect competition, firms will produce at the minimum point on their LAC curve.
   a) To find the minimum of LAC, we set \( dLAC/dQ \) equal to 0.

   Therefore, \(-20 + Q_F = 0\), so that \( Q_F = 20 \). The firm’s demand curve is horizontal and tangent to LAC. Therefore, price is equal to the minimum value of LAC. We find minimum LAC to be: \( 300 - (20)(20) + 0.5(20) = 100. \) Thus, \( P_C = 100 \).

3. We know that MC = 20.
   a) In turn, \( R = PQ = 100Q - 2Q^2 \), so that \( MR = 100 - 4Q \). The monopolist produces according to: \( MR = MC \), implying that \( 100 - 4Q = 20 \), so \( Q = 20 \). In turn, \( P = 100 - (2)(20) = $60 \).

4. Given the equations below
   \[ P = 300 - 3Q \text{ and } P = 470 - 5Q \]
   a) Derive the total revenue (TR) equations, and take the derivative of each.
   \[ TR = 300Q - 3Q^2 \text{ and } TR = 470Q - 5Q^2 \] such that
   \[ MR = 300 - 6Q \text{ and } MR = 470 - 10Q \]
   b) Set the two demand curves segments equal to each other, and solve for \( Q \) at the point of intersection.
   \[ 300 - 3Q = 470 - 5Q \]
   \[ 5Q - 3Q = 470 - 300 \]
   \[ Q = 85 \]
   and
   \[ P = 300 - 3(85) = N$45 \]