1. An online t-shirt retailer pays $700 to start up a website and acquires t-shirt to sell at a price of $5 per t-shirt, then sells the t-shirts at a price of $12 each.

   (a) Give the cost \( C(q) \), revenue \( R(q) \) and profit \( \pi(q) \) functions where \( q \) is the number of t-shirts sold.

   \[
   C(q) = 700 + 5q \quad \text{(2)} \\
   R(q) = 12q \quad \text{(2)} \\
   \pi(q) = 12q - (700 + 5q) = 5q - 700 \quad \text{(2)}
   \]

   (b) How many t-shirts does the retailer need to sell to break even?

   \[
   R(q) = C(q) \quad \text{or} \quad \pi(q) = 0 \\
   7q - 700 = 0 \\
   q = 100 \text{ shirts} \quad \text{(2)}
   \]

   (c) Sketch the cost and revenue functions on the same axis and label fixed costs, break-even quantity.

2. Suppose the Demand equation is given by \( q = 100 - 2p \) and the Supply equation by \( q = 3p - 50 \)

   (a) Explain the economic significance of the Supply and Demand curves.

   Supply relates the quantity \( q \) that manufacturers are willing to make for a price \( p \).

   Demand relates the quantity demanded by consumers at price \( p \).

   (b) Find the equilibrium price and quantity.

   \[
   100 - 2p = 3p - 50 \\
   150 = 5p \\
   p = 30 \quad \text{(2)}
   \]

   \[
   q = 100 - 2p \\
   q = 100 - 60 \\
   q = 40 \quad \text{(2)}
   \]