1. Plot the graph of each of the following quadratic functions:
(a) $y = x^2 - 6x + 5$; (b) $y = P^2 - 49$; (c) $y = Q^2 - 6Q + 9$.

2. The demand function for a good is given by $P = 12 - Q$.
(a) Write down and expression for TR as a function of Q only and simplify.
(b) Graph TR as a function of Q by taking values of Q from 0 to 12 (in jumps of 2).
What are the points of intersection of the curve with the axes? What is the maximum point?
(c) Confirm the roots and the maximum point algebraically.

3. A firm's total cost function is given by $TC = 200 + 3Q$,
while the demand function is given by $P = 107 - 2Q$.
(a) Express the total revenue function TR in terms of Q.
(b) Graph TR for $0 \leq Q \leq 60$. Use the graph to estimate the maximum point (Q and TR values).
Then find them exactly (algebraically).
(c) Plot the total cost function on the same graph as TR. Use the graph to find the break-even points.
Then find them exactly (algebraically).
(d) From the graph, determine for what range of values of Q does the company make a profit?
(e) Find the profit $\pi = TR - TC$ in terms of Q and graph this for $0 \leq Q \leq 60$.
(f) Find the Q-values for which profit is zero? Where have you seen these before?
(g) Find the output Q that maximises the profit and find the maximum profit.