

**MS115 Mathematics for Enterprise Computing**  
**Tutorial Sheet 7**

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

$$Q_D = -4P + 9.$$

- (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  $TC = \left(\frac{1}{4}\right)Q_D + 3$ , express the profit function as a quadratic function in  $Q_D$ .
  - (iv) Determine the values of  $Q_D$  for which profit equals zero.
  - (v) Determine the values of  $Q_D$  for which there is a positive profit.
  - (vi) Determine the value of  $Q_D$  which results in the maximum profit.
  - (vii) Determine the maximum profit.
2. A man has five suits, seven shirts and three ties. How many different outfits can he put together?
3. A bank P.I.N. is a number consisting of four digits.
- (i) Determine the total number of bank P.I.N.s.
  - (ii) Determine the total number of bank P.I.N.s in which no digit is repeated.
  - (iii) Determine the total number of bank P.I.N.s in which the first digit is non-zero and no digit is repeated.
4. There are 12 participants in a race. Determine the total number of possible podium outcomes.
5. A palindrome is a sequence of letters that reads the same backwards and forwards (eg. XYYX or NAVAN or ABLEWASIEREISAWELBA).
- (i) Determine the total number of four-letter palindromes.
  - (ii) Determine the total number of five-letter palindromes.