## MS115 Mathematics for Enterprise Computing
## Tutorial Sheet 8

1. Consider the five letters in the word "bread".

   (*i*) Determine the number of ways of arranging these five letters in order, i.e. determine the number of five-letter strings that can be formed using distinct letters.

   (*ii*) Determine the number of four-letter strings that can be formed using distinct letters.

2. Consider the set $S = \{a, b, c, d, e\}$.

   (*i*) Determine the total number of subsets of $S$.

   (*ii*) Determine the total number of subsets $T$ of $S$ such that $|T| = 3$.

3. A committee of 5 people is formed from a panel of 15 candidates, 9 of whom are male and 6 of whom are female.

   (*i*) Determine the total number of possible committees that may be formed.

   (*ii*) Determine the total number of possible committees that contain no males.

   (*iii*) Determine the total number of possible committees that contain two females and three males.

   (*iv*) Determine the total number of possible committees that contain at least one male and at least one female.

4. The main draw in the Irish national lottery consists of selecting 6 numbered balls from a total of 47.

   (*i*) Determine the total number of possible outcomes of this draw.

   (*ii*) Suppose that your lottery ticket consists of one selection of 6 numbers from the 47 possibilities. Consider the event that exactly 3 of the numbers on your ticket match those on the drawn balls. In how many ways can this event occur?

5. A governmental cabinet consists of 22 members. A secret ballot is taken, whereby each member must choose one of two options: "Deal" or "No deal". The 22 votes are pooled together and counted. Determine the number of possible outcomes to this vote.