MS115 Mathematics for Enterprise Computing
Tutorial Sheet 9

1. Consider the ten letters in the word "ENTERPRISE".

    (*i*) Per class, add subscripts to these letters where necessary to produce a string of ten distinct letters.

    (*ii*) Per class, strings that coincide upon the removal of subscripts are equivalent. List all the elements in an equivalence class of your choice.

    (*iii*) Determine the number of elements in each equivalence class.

    (*iv*) Determine the number of ways of ordering the letters in the word "ENTERPRISE".

2. Determine the number of ways of ordering the fifteen letters in the string "SUPPLYANDDEMAND".

3. Twelve students are to be divided into three groups A, B, C of equal size. Determine the total number of possible outcomes of this process.

4. An experiment consists of randomly choosing a lowercase letter from the English alphabet.

    (*i*) List the outcomes that make up the sample space Ω.

    (*ii*) List the outcomes that make up the event E that the randomly-chosen letter is a vowel.

    (*iii*) Determine $p(E)$, the probability of E.

    (*iv*) Determine $p\left(\overline{E}\right)$, the probability of $\overline{E}$.

5. A pair of dice is thrown and the sum of their values is recorded.

    (*i*) List the outcomes in the sample space Ω.

    (*ii*) List the outcomes that make up the following events:

     A is the event that the sum is greater than 7,
     B is the event that the sum is an odd number.

    (*iii*) List the elements of the following events: $\overline{A}$, $A \cap B$, $A \cup B$.

    (*iv*) Give the probabilities of all the outcomes in the sample space Ω.

    (*v*) Determine $p(A)$, $p(B)$ and $p(A \cap B)$.