Discrete Mathematics (PCIT -110)
Assignment-1

1. In a group of 100 students, 72 students can speak English and 43 students can speak Hindi. Based on these data, answer the following questions:

a) Find the number of students who can speak English only.
b) Find the number of students who can speak Hindi only.
c) Find the number of students who can speak both English and Hindi.

2. State Pigeonhole Principle.
3. 3. Let G be the set of all 2*2 matrices $\begin{matrix} a & b \\ c & d \end{matrix}\ \begin{matrix} a & b \\ c & d \end{matrix}$ where a,b,c,d are real numbers, such that ab-bc are not equal to zero. Show that G is a non Abelian Group for multiplication of matrices defined as:

$$\begin{matrix} a & b \\ c & d \end{matrix}\ \begin{matrix} w & x \\ y & z \end{matrix} = \begin{matrix} aw+by & ax+bz \\ cw+dy & cx+dz \end{matrix}$$

4. Consider group G (1,2,3,4,5) under multiplication modulo 6.
   a) Find multiplication table of G.
   b) Prove that G is a group.
   c) Find 2^{-1}, 3^{-1}, 1^{-1}.
   d) Find the subgroups generated by 2 and 3.
   e) Is G cyclic? Justify your answer.