**Assignment #4** **Marks: 25**

1. Given the following matrices:

$$A = \begin{bmatrix} 2 & 3 & -1 \\ 1 & 2 & 1 \\ -1 & -1 & 3 \end{bmatrix} \qquad B = \begin{bmatrix} 7 & -8 & 5 \\ -4 & 5 & -3 \\ 1 & -1 & 1 \end{bmatrix} \qquad C = \begin{bmatrix} 4 & -5 & 2 \\ 1 & 3 & -3 \end{bmatrix}$$

Evaluate the following. If the operation is not defined, ***explain why*** for full marks.

a) AB [3 marks]

b) B – C [1 mark]

c) Prove that B is the inverse of A [3 marks]

2. For the vectors A = $\begin{bmatrix} 2 \\ 3 \end{bmatrix}$, B = $\begin{bmatrix} 1 \\ -3 \end{bmatrix}$

a) Sketch both vectors [1 mark]

b) Determine the magnitude of each vector and the direction of each vector with respect to the x – axis. [4 marks]

c) Determine the angle between A and B. [2 marks]

d) For the column vector A, state the transformation matrix and the resulting vector when:
   1) A is stretched by a factor of 1/2 along the y axis
   2) A is rotated $60°$ clockwise.
   3) A is reflected about the x axis. [ 5 marks]
   4) Create a combo matrix for above mentioned transformations

3. Solve the system of equations using the inverse of matrices. [6 marks]

$$x + y + z = 6$$
$$2y + 5z = -4$$
$$2x + 5y - z = 27$$