PROBLEM SHEET – 2

1. Create a row vector that has the following elements: 3, $4 \cdot 2.55$, $68/16$, 45, $\sqrt[3]{110}$, $\cos 25°$, and 0.05.

2. Create a column vector that has the following elements: $\dfrac{32}{3.2^2}$, $\sin^2 35°$, 6.1, $\ln 29^2$, 0.00552, $\ln^2 29$, and 133.

3. Create a row vector with 9 equally spaced elements in which the first element is 81 and the last element is 12.

4. Create a column vector with 15 equally spaced elements in which the first element is –21 and the last element is 12.

5. Use a single command to create a row vector (assign it to a variable named a) with 9 elements such that the last element is 7.5 and the rest of the elements are 0s. Do not type the vector explicitly.

6. Create a vector (name it vecA) that has 14 elements of which the first is 49, the increment is –3, and the last element is 10. Then, using the colon symbol, create a new vector (call it vecB) that has 8 elements. The first 4 elements are the first 4 elements of the vector vecA, and the last 4 are the last 4 elements of the vector vecA.

7. Create the following matrix by using vector notation for creating vectors with constant spacing and/or the linspace command. Do not type individual elements explicitly.

$$A = \begin{bmatrix} 0 & 5 & 10 & 15 & 20 & 25 & 30 \\ 600 & 500 & 400 & 300 & 200 & 100 & 0 \\ 0 & 0.8333 & 1.6667 & 2.5 & 3.3333 & 4.1667 & 5 \end{bmatrix}$$

8. Create three row vectors:

$$a = \begin{bmatrix} 7 & 2 & -3 & 1 & 0 \end{bmatrix}, \quad b = \begin{bmatrix} -3 & 10 & 0 & 7 & -2 \end{bmatrix}, \quad c = \begin{bmatrix} 1 & 0 & 4 & -6 & 5 \end{bmatrix}$$

(a) Use the three vectors in a MATLAB command to create a 3×5 matrix in which the rows are the vectors a, b, and c.

(b) Use the three vectors in a MATLAB command to create a 5×3 matrix in which the columns are the vectors a, b, and c.

9. Create three row vectors:

$$a = \begin{bmatrix} 7 & 2 & -3 & 1 & 0 \end{bmatrix}, \quad b = \begin{bmatrix} -3 & 10 & 0 & 7 & -2 \end{bmatrix}, \quad c = \begin{bmatrix} 1 & 0 & 4 & -6 & 5 \end{bmatrix}$$

(a) Use the three vectors in a MATLAB command to create a 3×3 matrix such that the first, second, and third rows consist of the first three elements of the vectors a, b, and c, respectively.

(b) Use the three vectors in a MATLAB command to create a 3×3 matrix such that the first, second, and third columns consist of the last three elements of the vectors a, b, and c, respectively.

10. Given are a 5×6 matrix A, a 3×6 matrix B, and a 9-element vector v.

$$A = \begin{bmatrix} 2 & 5 & 8 & 11 & 14 & 17 \\ 3 & 6 & 9 & 12 & 15 & 18 \\ 4 & 7 & 10 & 13 & 16 & 19 \\ 5 & 8 & 11 & 14 & 17 & 20 \\ 6 & 9 & 12 & 15 & 18 & 21 \end{bmatrix}$$

$$B = \begin{bmatrix} 5 & 10 & 15 & 20 & 25 & 30 \\ 30 & 35 & 40 & 45 & 50 & 55 \\ 55 & 60 & 65 & 70 & 75 & 80 \end{bmatrix}$$

$$v = \begin{bmatrix} 99 & 98 & 97 & 96 & 95 & 94 & 93 & 92 & 91 \end{bmatrix}$$

Create the three arrays in the Command Window, and then, by writing one command, replace the last four columns of the first and third rows of A with the first four columns of the first two rows of B, the last four columns of the fourth row of A with the elements 5 through 8 of v, and the last four columns of the fifth row of A with columns 3 through 5 of the third row of B.