Exam #1, Oct. 9, 2012 **Name:**
Math 445, University of New Hampshire

1. Write one line of Matlab code that assigns a 3-d **column** vector with components 4,5,7 to variable x.

2. Write one line of Matlab code that assigns a 3-d **row** vector with components 4,5,7 to variable x.

3. Write Matlab code that simulates the shuffling of a deck of cards by producing a random permutation of the integers 1 through 52.

4. Write Matlab code that draws a unit circle, using the formulae $x = \cos\theta$ and $y = \sin\theta$ for 200 evenly spaced values of θ between 0 and 2π. Label the axes and make the circle red.

5. Write a conditional expression that evaluates to 1 (true) if x and y are equal or if either is zero.

6. Show how to solve the system of equations with three lines of Matlab code.

$$\begin{aligned} 2x + 3y - 8 &= 0 \\ y - 4z + 10 &= 0 \\ 5z - 2x - 13 &= 0 \end{aligned}$$

Problems 7 and 8 on reverse side.

7. Let A be an $M \times K$ matrix and B be an $K \times N$ matrix. Then the product $C = AB$ is an $M \times N$ matrix whose elements are given by

$$C_{ij} = \sum_{k=1}^{K} A_{ik} B_{kj}$$

Write a Matlab function `matrixmult` that returns the product C of matrices A and B. Use the above formula instead of Matlab's built-in matrix multiplication!

8. Matrix multiplication $C = AB$ is defined only for compatible matrices: the number of columns of A must equal the number of rows of B. Write a short piece of Matlab code that could be inserted in your `matrixmult` function that prints an error message and returns a null (0×0) matrix if A and B are incompatible.