ECON 502 **MATLAB EXERCISES** **Nov 9, 2007**
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Please turn in only Questions 1, 3, 5, and 9 (Due 11/16). You can find the answers for the rest on the website.

Try to answer the following questions with the shortest code possible, using mainly MATLAB's built-in functions.

1. Create a vector x with the elements ...

   a. 2, 4, 6, 8, ..., 100
   b. 10, 8, 6, 4, 2, 0, -2, -4
   c. 1, 1/2, 1/3, 1/4, 1/5
   d. 0, 1/2, 2/3, 3/4, 4/5

2. Let x = [2 5 1 6].

   a. Add 16 to each element
   b. Add 3 to just the odd-index elements
   c. Compute the square root of each element
   d. Compute the square of each element

3. Let x = [3 2 6 8]' and y = [4 1 3 5]' (NB. x and y should be column vectors).

   a. Add the sum of the elements in x to y
   b. Raise each element of x to the power specified by the corresponding element in y.
   c. Divide each element of y by the corresponding element in x
   d. Multiply each element in x by the corresponding element in y, calling the result "z".
   e. Add up the elements in z and assign the result to a variable called "w".
   f. Compute x'*y - w and interpret the result

4. Create a vector x with the elements,

$$x_n = (-1)^{n+1}/(2n-1)$$

   Add up the elements of the version of this vector that has 100 elements.

5. Given the array A = [2 4 1; 6 7 2; 3 5 9], provide the commands needed to

   a. assign the first row of A to a vector called x1
   b. assign the last 2 rows of A to an array called y
   c. compute the sum over the columns of A
   d. compute the sum over the rows of A
   e. compute the standard error of the mean of each column of A (NB. the standard error of the mean is defined as the standard deviation divided by the square root of the number of elements used to compute the mean.)

6. Given the array A = [2 7 9 7; 3 1 5 6; 8 1 2 5], provide the command that will

a. assign the even-numbered columns of A to an array called B
b. assign the odd-numbered rows to an array called C
c. convert A into a 4-by-3 array
d. compute the reciprocal of each element of A
e. compute the square-root of each element of A

7. Given the vector x = [1 8 3 9 0 1], create a short set of commands that will

a. add up the values of the elements (Check with **sum**.)
b. compute the running sum (for element j, the running sum is the sum of the elements from 1 to j, inclusive. Check with **cumsum**.)
c. compute the sine of the given x-values (should be a vector)

8. Create an M-by-N array of random numbers (use **rand**). Move through the array, element by element, and set any value that is less than 0.2 to 0 and any value that is greater than (or equal to) 0.2 to 1.

9. Write a script that will use the random-number generator **rand** to determine the following:

a. The number of random numbers it takes to add up to 20 (or more).
b. The number of random numbers it takes before a number between 0.8 and 0.85 occurs.
c. The number of random numbers it takes before the mean of those numbers is within 0.01 of 0.5 (the mean of this random-number generator).