

1. Plot the two functions below for the values of  $t$  indicated.
  - a)  $f(t) = 2e^{-3t}$  for  $t = 0, 0.2, 0.4, \dots, 3$ . Using matlab's help by typing **help exp** at the prompt might be useful.
  - b)  $f(t) = 2e^{-3t} \cos(4t)$  for  $t = 0, 0.25, 0.5, \dots, 3$ .
  
2. Given the complex numbers  $c = -1 + j2$  and  $d = 2e^{j\pi/3}$ , perform the following operations using a matlab diary file to record all matlab results. Turn in a printout of the diary file as part of your homework solutions.
  - a) Find  $c$  in polar form using matlab. Ensure the magnitude and angle are clearly indicated.
  - b) Find  $d$  in rectangular form using matlab. Ensure the real and imaginary parts are clearly indicated.
  - c) Sketch  $c$  in the complex plane labeling the real and imaginary parts as well as the magnitude and angle.
  - d) Sketch  $d$  in the complex plane labeling the real and imaginary parts as well as the magnitude and angle.
  
3. Given the two matrices below, perform the following operations in matlab. Record all your matlab work in a diary file and include a printout of this file as part of your homework solutions.

$$A = \begin{bmatrix} 1 & -2 & 4 \\ -3 & 1 & -5 \\ 2 & 3 & -4 \end{bmatrix}, \quad B = \begin{bmatrix} 4 & -3 \\ 2 & -1 \\ 0 & 1 \end{bmatrix}$$

- a)  $AB$  (matrix multiplication)
- b)  $BA$
- c)  $A^{-1}$  (the matrix inverse of  $A$ , getting matlab help on the **inv** function could be useful)
- d)  $B^{-1}$
- e) perform element by element multiplication of  $A$  times  $A$ , not matrix multiplication
- f) compute the determinant of  $A$
- g) determine the rank of  $A$