EE 362: Signals and Systems Name:----------

Spring 2019

Homework #11 (Due: Tuesday, April 23, 2019)

- Circle or box your answer (don't forget units).
- **Show** your steps.
- Use 8.5" x 11" paper, and trim off any ragged edges.
- **Staple** your work together and write your name neatly.

1. Compute Laplace transform of the following functions. [8 points]

a) $x(t) = \begin{cases} 2, & 0 \le t \le 2 \\ 0, & \text{otherwise} \end{cases}$

b) $x(t) = 2 - 4e^{-2t}$

c) $x(t) = te^{-2t}\cos(3t)$

d) $x(t) = (1 - e^{-2t})^2$

e) $x(t) = \cos^2(3t)$

2. Compute the initial values and final values (if possible) of the following functions. [4 points]

a) $X(s) = \frac{2}{s^4+6s^3+11s^2+6s}$

b) $X(s) = \frac{10s^2}{(s+1)(s^2+1)}$

3. Compute the inverse Laplace transform of the following functions. [10 points]

a) $X(s) = \frac{2}{s^2+3s+2}$

b) $X(s) = \frac{3s+5}{s^2+7}$

c) $X(s) = \frac{5}{s^2-9}$

d) $X(s) = \frac{3(s+3)}{s^2+6s+8}$

e) $X(s) = \frac{s+1}{s^4+4s^3+4s^2}$

Note: Problems must be solved by hand. However, you can use MATLAB commands such as roots, residue, laplace, and ilaplace to help in verifying your answers.