EE 362: Signals and Systems Name: _____

Spring 2019

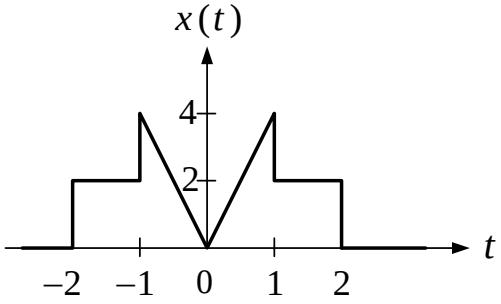
Homework #1 (Due: Tuesday, January 29, 2019)

- 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- Find the magnitude and angle of the following complex numbers, [3 points]
   a) $x = -8 + j6$
   b) $x = 8 - j6$
2- Express the following functions in terms of sinusoidal functions, [3 points]
   a) $x = 5e^{-j2\theta}$
   b) $x = 3e^{-\theta}$
3- Find the derivative of the following functions with respect to ω, [3 points]
   a) $x = \frac{j2\omega}{5+j\omega}$
   b) $x = 2e^{-j\omega}$
4- Determine the relationship between the unit step, unit ramp, and unit impulse functions – use the derivative and integral properties. [4 points]
5- Prove the following property, [3 points]

$$f(t)\delta(t-2) = f(2)\delta(t-2)$$

6- Show that the following continuous-time signal is equal to the sum of rectangular pulses $P_\tau(t)$ and/or triangular pulses $\left(1 - \frac{2|t|}{\tau}\right) P_\tau(t)$. [3 points]



7- For the continuous-time signal given in problem 6, express the function in terms of shifted step functions $u(t - t_1)$ and/or ramp functions $r(t - t_2)$. [3 points]

Total possible points: 22