SOLUTIONS

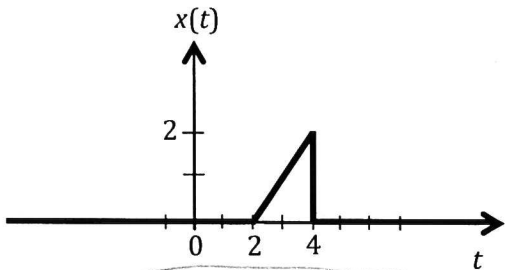
Quiz #1

ECEn 380: Signals & Systems

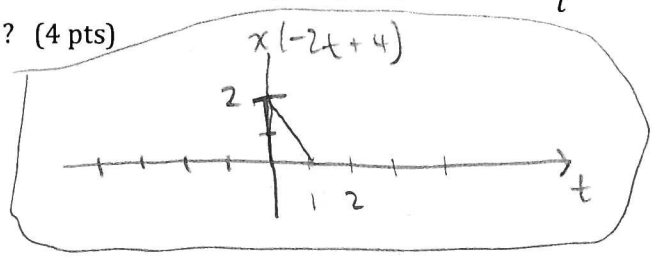
Fall 2014

Closed book, closed note, closed neighbor, no calculators allowed. *Time limit is 10 minutes. 20 points total possible.*

1. Consider the following function $x(t)$:



   a. Sketch and carefully label $x(-2t + 4)$? (4 pts)



   b. Write an expression for $x(t)$ in terms of a shifted ramp function $r(t)$ multiplied by a shifted unit step function $u(t)$. (3 pts)

$$x(t) = r(t-2)\,u(4-t)$$

   c. Is $x(t)$ causal, anti-causal, non-causal, or more than one? Circle all that apply. (3 pts)

   i. Causal
   ii. Anti-causal
   iii. Non-causal

   d. Is $x(t)$ as shown digital or analog? Continuous time or discrete time? Circle the best answer. (3 pts)

   i. Analog and continuous time
   ii. Analog and discrete time
   iii. Digital and discrete time

2. Evaluate the following integral: (4 pts)

$$\int_{-\infty}^{\infty} (t-1)^3\, e^{-(t-3)^2}\, \delta(t-4)\,dt$$

EVALUATE $(t-1)^3 e^{-(t-3)^2}$ AT $t=4$:

$$(4-1)^3 e^{-(4-3)^2} = 27e^{-1}$$

3. The "impulse response" $h(t)$ of a linear, time-invariant (LTI) system is the output of the system to what input? (3 pts)

$\delta(t)$ OR UNIT IMPULSE