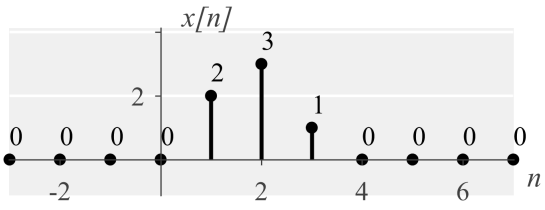
Full Name: _____ **Lab Section:** _____

ECE 3500 (Fall 2016) – Examples #1

Question #1: Consider the following discrete-time signal, which we refer to as x[n]:



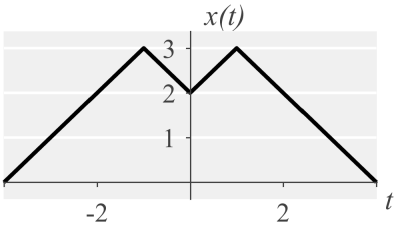
(a) Sketch $3x[n]$.

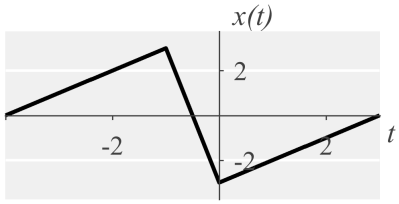
(b) Sketch $x[n-2]$.

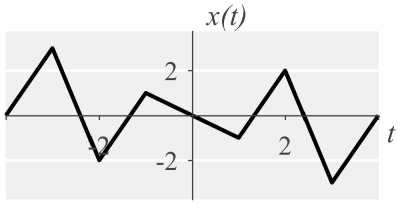
(c) Sketch $x[3-n]$.

(d) Is x[n] an energy signal? Is x[n] an average power signal? Is x[n] a causal signal? Is x[n] a periodic signal?

Question #2: Consider the following 3 respective signals, $x(t)$, $y(t)$, $z(t)$:







(a) For signals $x(t)$, $y(t)$, and $z(t)$, determine if they are **odd**, **even**, or **neither**.

Question #3: Consider the continuous-time signal

$$x(t) = \begin{cases} 0 & \text{if} \quad t < 0 \\ t^2 & \text{if} \quad 0 \leq t \leq 2 \\ 0 & \text{if} \quad t > 2 \end{cases}$$

(a) Sketch x(t). Is x(t) periodic? Is x(t) causal?

(b) Compute the energy of the signal.

(c) Compute the power of the signal.

Question #4: Consider the continuous-time signal

$$x(t) = \cos(2\pi t)$$

(a) Sketch the signal.

(b) Is the signal continuous or discrete?

(c) Is the signal even, odd, or neither?

(d) Is the signal causal, anti-causal, or acausal?

(e) Compute the energy of the signal?

(f) Compute the power of the signal?

Question #5: Consider the discrete-time signal

$$x[n] = \begin{cases} 0 & \text{if} \quad n < -2 \\ -2n & \text{if} \quad -2 \leq n \leq 2 \\ 0 & \text{if} \quad n > 2 \end{cases}$$

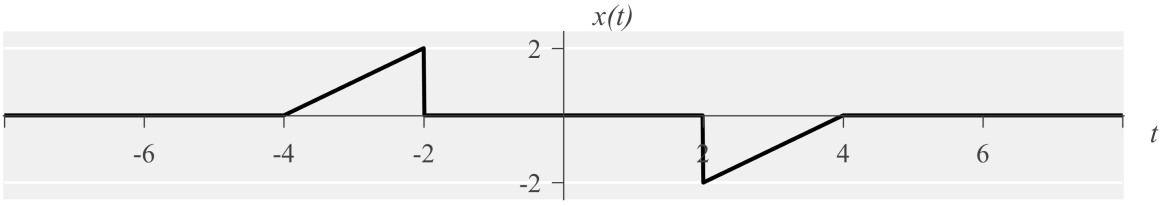
(a) *(3 pts)* Sketch x[n].

(b) *(2 pts)* Is the signal causal, anti-causal, or neither?

(c) *(2 pts)* Is the signal even, odd, or neither?

(d) *(3 pts)* If $x[n]$ is an energy signal, compute its energy. If $x[n]$ is a power signal, compute its power.

Question #6: Consider the continuous-time signal shown below.



(a) *(2 pts)* Sketch $x(t+1)$

(b) *(2 pts)* Sketch $2x(t-2)$

(c) *(3 pts)* Sketch $5\,x(t/3)$

(d) *(3 pts)* Sketch $x(t) - x(-t)$