University of Kentucky
Department of Electrical and Computer Engineering

EE421G: Signals and Systems I – Fall 2007 (Quiz 1)

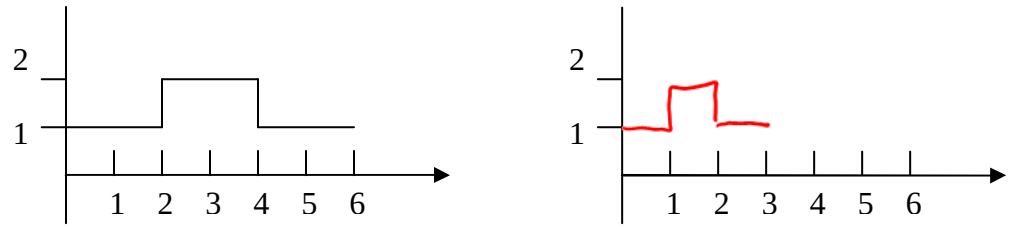
Name: _____

You are allowed to use your books and notes. You must do your own work or you will receive no points. You have **20 minutes** to do this quiz.

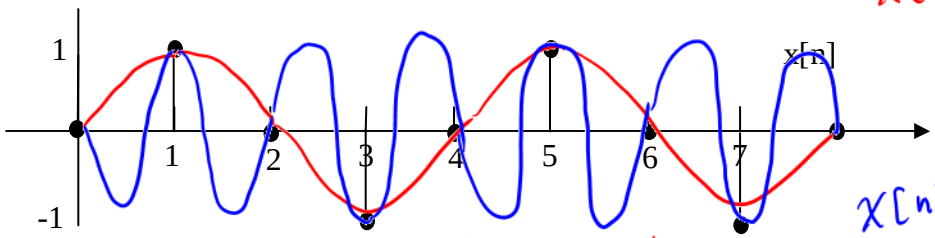
1) (2 points) Write down the discrete time sifting property.

$$x[n_0] = \sum_{n=-\infty}^{\infty} x[n]\,\delta[n_0 - n]$$

2) (2 points) x(t) is shown below. Please draw x(2t) in the space provided.



3) (4 points) Draw two possible continuous-time sinusoidal signals that can give rise to the following discrete-time sequence when sampling at 1Hz.



$x[n] = \sin\left(\frac{\pi}{2}t\right)\Big|_{t=n}$

$x[n] = -\sin\left(\frac{3\pi}{2}t\right)\Big|_{t=n}$

and many other possible choices.

4) (2 points) In problem 3, what is the fundamental frequency of the discrete-time sequence? Please explain.

From 3), all possible frequencies can be written in the form of

$$\omega = \frac{\pi}{2} + k\frac{2\pi}{1}$$

Fundamental frequency = ω with the smallest magnitude

$= \pi/2$ or 0.25 Hz