

# EE 311 Homework 10 Signals and Systems

Name \_\_\_\_\_

1. For the following signal:

$$x[n] = 3 \cos(0.16\pi n + 1) + 4 \cos(0.15\pi n + 2)$$

1a. Compute the fundamental period of  $x_1[n] = 3 \cos(0.16\pi n + 1)$

1b. Compute the fundamental period of  $x_2[n] = 4 \cos(0.15\pi n + 2)$

1c. Compute the fundamental period of  $x[n] = x_1[n] + x_2[n]$

1d. Compute the fundamental angular frequency of  $x[n]$

2. For a system whose impulse response  $h(t)$  is given by:

$$h(t) = e^{3t}u(t) - e^{2t}u(t)$$

2a) Determine the expression for  $H(s)$

2b) Show that derivative feedback (using  $G(s) = Ks$ ) can stabilize the system, and determine the value of  $K$  that does it.