## Department of Electrical and Computer Engineering The University of Alabama in Huntsville

#### CPE 381: Fundamentals of Signals and Systems for Computer Engineers

#### **Quiz #1 Solution**

1. (30 points) Since thermistor has the following characteristics:

$$R(t) = -t + 160 [K\Omega]$$

resistance for t=80°F will be:

$$R_{min} = -80 + 160 = 80 \text{ K}\Omega$$
,

and resistance for t=40°F will be:

$$R_{max} = -40 + 160 = 120 \text{ K}\Omega$$

$$V_{min} = \frac{Rmin(t)}{R + Rmin(t)} 2V = \frac{80}{80 + 80} 2V = 1V$$

$$V_{max} = \frac{Rmax(t)}{R + Rmax(t)} 2V = \frac{120}{80 + 120} 2V = 1.2V$$

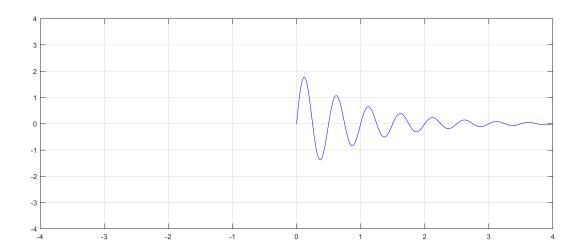
2. (10 points) 
$$\int_{2}^{4} x \ dx = \frac{x^{2}}{2} \Big|_{2}^{4} = \frac{16}{2} - \frac{4}{2} = 6$$

3. (10 points) 
$$\int_0^1 \sin(2\pi t) dt = -\frac{1}{2\pi} \cos(2\pi t) \Big|_0^1 = 0$$

4. (20 points) Infinite sum: 
$$1 + \frac{1}{4} + \frac{1}{16} + \dots = \sum_{i=0}^{\infty} \left(\frac{1}{4}\right)^i = \frac{1-r^{\infty}}{1-r} = \frac{1}{1-\frac{1}{4}} = \frac{4}{3}$$

### 5. (20 points)

$$y = 2 \cdot e^{-t} sin(4\pi t), t \ge 0.$$



# 6. Plot *sinc* function $\left(\frac{\sin x}{x}\right)$ .

