EECS20N Quiz 1, 9/13/99

The quiz is to provide feedback to you and to me about how well you've followed the material.

The quiz will take 15 minutes. Do your calculations on the sheet and put a box around your answer .

Please print your name here:

Last Name ———————————————— First ————————————————

1. Suppose a signal $x : Reals \rightarrow Reals$ is sampled at 8,000 KHz and the resulting samples go through a 8-bit quantizer. What is the bit rate of the resulting binary signal?___ **Ans** The bit

   rate is

   $$\text{no of samples/sec} \times \text{ no of bits/sample} = 8,000,000 \times 8 = \boxed{64 \text{ Mbits/sec}}$$

2. The signal $\cos(\omega_s t)$ is used to AM modulate the carrier $\cos(\omega_c t)$, so that the transmitted signal is x, where
   $$x(t) = [1 + \cos(\omega_s t)] \times \cos(\omega_c t).$$

   Then x can be written as a sum of three sinusoids of frequencies: ————————————— .

   Ans Using $\cos(A)\cos(B) = 1/2[\cos(A+B) + \cos(A-B)]$ gives
   $$x(t) = \cos(\omega_c t) + 1/2[\cos(\omega_c + \omega_s)t + \cos(\omega_c - \omega_s)t$$

   so x is a sum of sinusoids of frequencies $\boxed{\omega_c, \omega_c + \omega_s, \omega_c - \omega_s}$.

3. Complete the anwser to the following Matlab program:
   ```
   x = [0 pi -pi];
   cos(x)
   ans =
   ```
   Ans
   ```
   ans = 
   ```
   $\boxed{\texttt{1 -1 -1}}$