

Assignment 9

Due: 11/27/2017

(1) Consider the pure tone $s(t) = 10 \sin(2\pi \times 3t)$,

(a) What is the fundamental frequency? *3 Hz*

(b) Graph this sound in the time domain. Make sure to label the x -axis and y -axis correctly.

(c) Graph the spectrum of this sound.

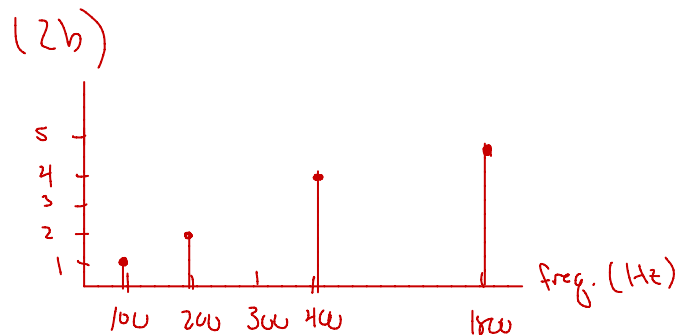
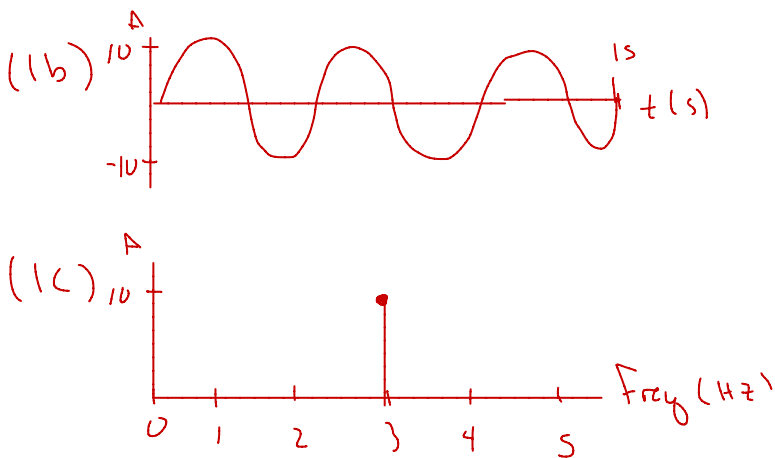
(2) Consider a sound represented by the following function:

$$s(t) = \sin(2\pi \times 100t) + 2 \sin(2\pi \times 200t) + 4 \sin(2\pi \times 400t) + 5 \sin(2\pi \times 1800t).$$

(a) What is the fundamental frequency and what are the overtones?

(b) Graph the spectrum of this sound. *Fundamental = 100 Hz*
Overtones = 200 Hz, 400 Hz, 1800 Hz

(3) Suppose you want to record a 3 second sound using 5 bits and a sampling rate of 8 samples per second. Label the axes of the time domain graph like we did in class. You do **not** have to plot any sound waves. The axes should have a "tick" showing where each bit is on the y -axis and where each sample will be recorded on the x -axis.

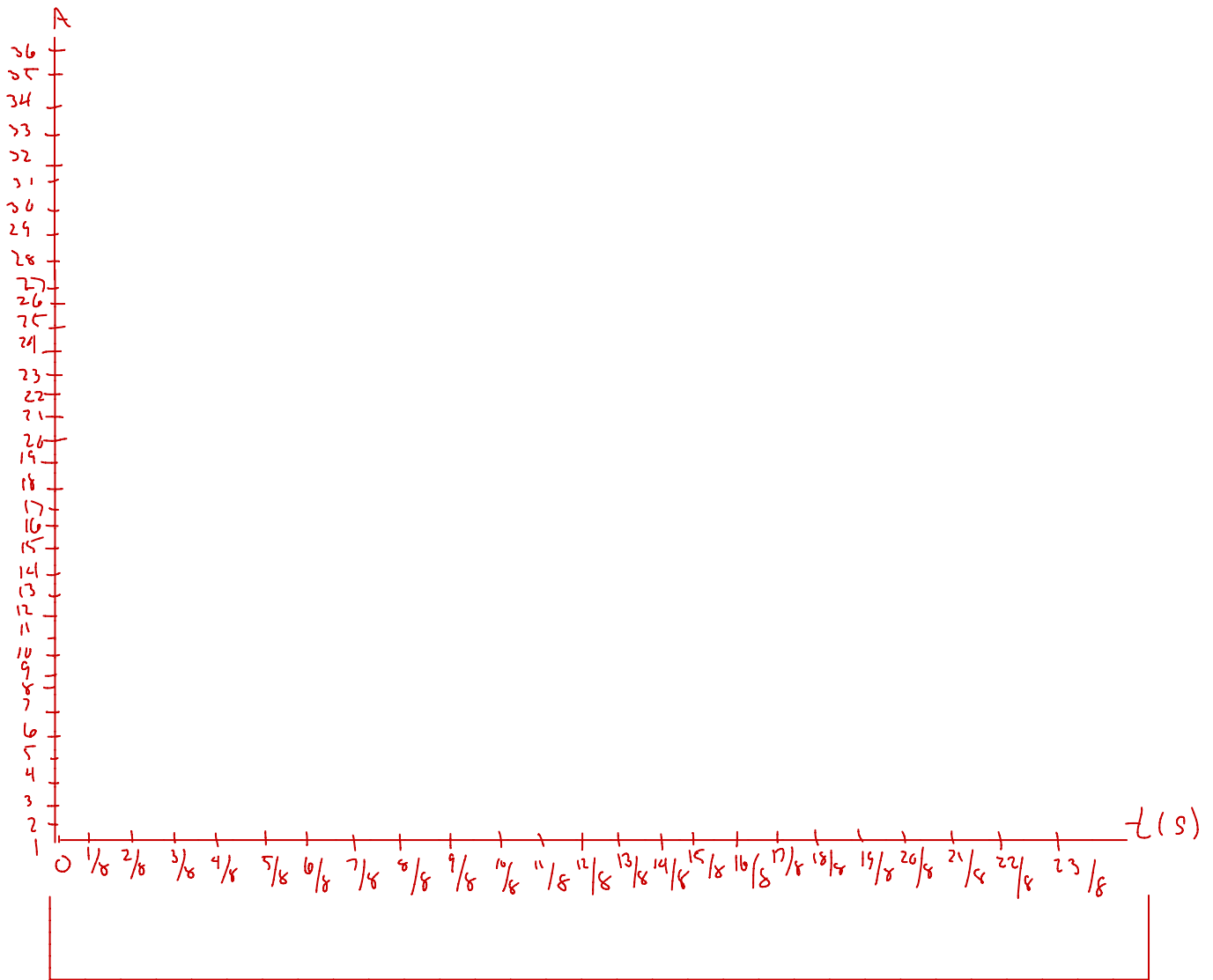


(3) 3 seconds

5 bits $\Rightarrow 2^5 = 32$ possible y -values

8 samples/s $\Rightarrow 3\text{ s} \times 8\text{ samples/s} = 24$ total samples taken

time between each sample = $\frac{1}{8}$ s.



24 samples