

Exam 2 Review

November 23, 2017

1. Chapter 16: Probability, Odds, & Expectations

- (a) Know how to count and list events. What is a simple event?
- (b) Counting:
 - i. Multiplication Rule for Counting - Know what it is and how to use it. Look at examples done in class and homework.
 - ii. Permutations/Combinations - Know what the difference between them is (order matters vs. order doesn't matter). Know how to count objects using the formulas. Look at examples done in class and homework.
- (c) Probability:
 - i. What is probability? Know the two important properties about probability. What is the probability of an event happening?
 - ii. Know what compliment events and independent events are.
 - A. How are compliment events used to calculate probabilities?
 - B. Multiplication principal for independent events.
 - C. Look at examples done in class and homework. Make sure you understand how we used compliment/independent events to make calculating certain probabilities easier.
- (d) Expectation:
 - i. What is expected value?
 - ii. Know how to calculate the total expected value. What does the expected value represent?
- (e) There are many examples that we did in this chapter. Make sure to understand how we used all of the above principals/tricks together to calculate probabilities, especially in examples towards the end of the chapter.

2. Music & Math

- (a) Sound is composed of two elements:
 - i. Loudness:
 - A. What is loudness? How is it measured (units)? What determines a loud sound versus a soft sound?

- ii. Pitch:
 - A. What is pitch? How is it measured (units)? What determines a high pitch versus a low pitch?
- (b) Pure Tones:
 - i. What is a pure tone?
 - ii. How is a pure tone represented mathematically?
 - iii. Know how to identify the frequency of a pure tone when given the equation.
 - iv. Know how to graph pure tones.
 - v. What is the Law of Superposition say?
 - vi. How is the Law of Superposition used to mathematically represent sounds?
- (c) Frequencies:
 - i. What is a fundamental frequency?
 - ii. What are overtones?
 - iii. Know how to identify between the two when given the equation of a sound.
- (d) Analog Vs. Digital Sound
 - i. What is analog sound? What is digital sound?
 - ii. What is a bit? Given N bits, how many different combinations are there? Know how to list them.
- (e) Storing Digital Sound
 - i. What is bit rate and sampling rate? How are they used to create a digital signal from an analog signal?
 - ii. How does the bit rate and sampling rate correspond to the quality of the digital signal?
 - iii. Know how to determine the time between each sample, the total number of samples taken, and at which times the samples are taken (see examples done in class/home-work).
 - iv. Know how to use the bit rate and sampling rate to label the axes.
- (f) Time Domain Vs. Frequency Domain
 - i. What is the time domain? What is the frequency domain?
 - ii. What are some practical examples for which each of them are used for?
 - iii. Given a pure tone or sum of pure tones, know how to graph the spectrum (frequency domain).
 - iv. Given any sound, what is the general idea behind the process of going from the time domain to the frequency domain?