Review Materials for Midterm 1

Exam coverage: Chapter 1, Chapter 3, Chapter 4.1 and 4.2

Suggested Extra Problems From Your Textbook:

Chapter 1:
1.3, 1.41(b), 1.47, 1.51, 1.53(b,c,d), 1.72, 1.77, 1.79, 1.86, 1.112

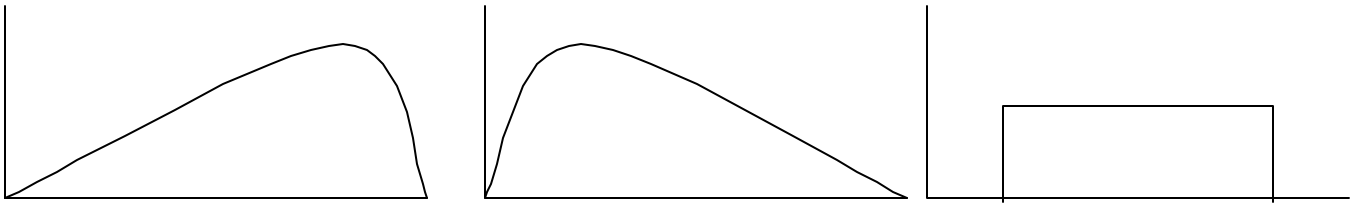
Chapter 3:
3.5, 3.8, 3.13, 3.33, 3.35, 3.49, 3.51-3.54, 3.65

Chapter 4:
4.11, 4.13, 4.15, 4.23, 4.25

Relevant Concepts & Statistics

Categorical & Quantitative variable
Distribution (symmetric, skewed)
Outlier
Histogram
Average (mean), Variance, Standard Deviation, Minimum, Maximum, Range, 25^{th} Percentile (first quartile Q1), Median, 75^{th} Percentile (third quartile Q3), Inter-Quartile Range, 1.5 * IQR Criterion for Outliers
Boxplot
Linear transformation
Treatment, Treatment Group, Control Group
Normal Distribution
Z-score
Standard Normal Distribution
Statistical Inference
Observational Study
Experiment, Experimental Units, Subjects, Treatment, placebo, bias, randomization, replication, double-blind
Population
Sample
Voluntary Response Sample
Simple Random Sample
Undercoverage, Non-Response, Wording of questions, Response bias
Parameter, Statistic
Sampling Distribution
Bias, variability
Sample Space, event, Probability Rules (p. 298), assigning probabilities, independent, multiplication rule

1. Here are three densities:



(i) (ii) (iii)

Match each density to the most appropriate choice listed below:

A. The average is bigger than the median
B. The average is approximately the same as the median
C. The average is smaller than the median
D. Cannot determine the average relative to the median

2. A recent study indicates that the average summer salary for undergraduate Economics majors is $2,000/month with a standard deviation of $1,500/month. The study went on to note that the top 2.5% of all undergraduate Economics majors will earn as much as $5,000/month this summer or possibly more.

Is the report's line of reasoning correct? First, answer yes or no and write that answer on the appropriate space on the answer sheet. Then, explain your reasoning in the space below. You may choose to use calculations, but I will want the conclusion written in plain English.

3. Jack and Jill, brother and sister, both take the GMAT with the hopes of going to business school one day. Jack scored a 590 and Jill scored a 490. Assume that the GMAT is normally distributed with a mean of 500 and a standard deviation of 100 for all people taking the exam. What percentage of test takers did better than Jill but not as well as Jack?

A. About 36%
B. About 46%
C. About 54%
D. About 60%
E. Over 60%

4. Stanford University Business School will only admit students with GMAT scores in the top 3% of all GMAT scores. Using the information in question 3 above, what is the minimum acceptable GMAT score? Show your work below , box your final answer here and then copy the final answer to the answer sheet.

Ten temperature readings from a freezer unit (in degrees Fahrenheit):

-9 -10 +1 +2 -5 0 0 +3 -11 +1

5. What are the average and median of this list? Show your work below, box your final answers and then copy the final answers to the answer sheet.

6. The formula for converting these readings into degrees Celsius (a temperature reading on the metric scale) is:

Celsius = 5/9 (Fahrenheit - 32)

Which statement below is correct about the list of numbers after the change of scale from Fahrenheit to Celsius?

A. The mean will change, but the median will remain the same
B. The mean and median will change, but the standard deviation will remain the same.
C. The range will remain the same but the standard deviation will change.
D. The mean and inter-quartile range will change, but the median will remain the same.
E. All of the above are false.

7. Amstar Corporation sued Domino's Pizza, Inc. claiming that Domino's use of the name "Domino" on its pizza infringed on the Domino Sugar trademark (owned by Amstar Corp.). Both sides presented survey evidence on whether Domino's Pizza, Inc.'s use of the name "Domino" tended to create confusion among consumers.

   Amstar surveyed 525 people in 10 cities in the eastern United States (two of the cities had Domino's Pizza outlets). The persons interviewed were women reached at home during the day who identified themselves as the household member responsible for grocery buying. Shown a Domino's Pizza box, 44.2% of those interviewed indicated their belief that the company that made the pizza made other products. 72% of that group (31.6% of all respondents) believed that the pizza company also make sugar.

Assume that a multistage sampling method was used to select the sample and that for our purposes, it produced a random sample of 525 people.

Do you think this is a good study? Answer yes or no and copy that answer to the answer sheet. For full credit justify your answer below. Please be brief, a few sentences will be sufficient. No calculations are required to answer this question.

8. A sociologist conducted a study on the effects of two teaching styles. One style was Authoritarian (A) with strict discipline and many rules. The other style was more Democratic (D) where students were given fewer restrictions and encouraged to set their own standards of conduct. Comparing standardized tests scores before and after the teaching techniques were introduced, she found the following:

ALL STUDENTS

STYLE	Number Improved	Number Unimproved	Total	% Improved
A	252	148	400	63%
D	210	190	400	53%

When she disaggregated the data into class in school, that is: Freshmen and Sophomores versus Juniors and Seniors she was surprised to see the following:

FRESHMEN AND SOPHOMORES

TEACHING STYLE	Number Improved	Number Unimproved	Total	% Improved
A	210	90	300	70%
D	75	25	100	75%

JUNIORS AND SENIORS

TEACHING STYLE	Number Improved	Number Unimproved	Total	% Improved
A	42	58	100	42%
D	135	165	300	45%

Which is the confounding variable?

A. Teaching Style
B. Percentage Improved (far right column)
C. Class in School
D. None of the above, there is no confounding in these tables

9. The estate of a wealthy man is protected by two alarm systems which function independently of each other. The first system has probability .81 of sounding an alarm when an intruder enters the grounds. The second system has probability .94 of sounding an alarm in the same circumstances. What is the probability that neither system sounds an alarm when an intruder enters?

(a) .01
(b) .13
(c) .25
(d) .76
(e) .86

10. Suppose that for a given entering class at UCLA this is the race & gender distribution:

	ANGLO	ASIAN	LATINO	AFRICAN AMERICAN.	OTHER
MALE	0.20	0.17	0.07	0.04	0.02
FEMALE	0.18	0.13	0.09	0.08	0.02

Assume these racial/ethnic classifications are mutually exclusive. If you can treat these proportions as probabilities, what is the probability that a student will be either Asian or Latino?

(a) .023
(b) .048
(c) .230
(d) .344
(e) .460