Review for Exam 1: Ch. 1 – 4

Exam 1 is Monday, March 11. You’ll want to bring your homework and labs, calculator, pencil and eraser [or pen], 3”x5” index card of your own notes (both sides), and I’ll provide the exam and the “Formulas and Tables” [you can see this handout on our class website].

There will be a mixture of multiple choice and demonstration/short answer problems (about 25 questions). The exam is worth 100 points.

Chapter 1 Introduction to Statistics

1–2 There’s lots of vocabulary there. Be able to use it correctly. Any questions from this section will be mostly multiple choice. Know when a table of data has matched pairs.

1–3 Be familiar with the problems that can arise in conducting a survey: randomness (or lack thereof), small samples, loaded questions and self interest studies are a few that jump out at me. Review the types of data (see my instructor video). Review the difference between a statistic and a parameter.

1–4 Questions here will be mostly short answer – one sentence, even. Be familiar with some of the ways a sample can be poorly collected. You may also be asked to calculate a percent.

1–5 Be able to distinguish between an observational study and an experiment. I will not ask about cross-sectional, retrospective and prospective studies. Do understand the basic ideas of random sampling (and simple random samples) Out of all the other types of sampling (systematic, convenience, stratified and cluster), you only need to be familiar with convenience sampling (and its pitfalls). I will not ask about sampling errors.

1–6 Be able to enter a list.

At the end of Chapter 1, you’ll find a section “Chapter Review”. I suggest reading this material, and considering problems # 1, 3, 4, 7.

Chapter 2 Summarizing and Graphing Data

2–2 Be able to create or interpret a frequency distribution (regular, relative and cumulative). I will not require you to enter large sets of data into your calculator (only small ones). Be sure to know the vocabulary for classes (limits, boundaries, midpoints, class width).

2–3 Be able to interpret a histogram.

2–4 Understand the difference between a histogram, a relative frequency histogram, a frequency polygon, an ogive and a scatterplot. There may be some but not a lot of graphing on the exam. You may find it easier to do any graphs by hand! Be able to construct and also to interpret a Stem-and-Leaf plot. I will not ask about Pareto charts, pie charts, or the other types of graphs mentioned.
Check out the “Chapter Review” at the end of Chapter 2. You might try the following problems:
Statistical Literacy and Critical Thinking: #2, 4

**Chapter 3 Statistics for Describing, Exploring, and Comparing Data**

3–2 Be able to find the **mean**, **median**, and **mode** from raw data. Also be able to find the **mean of a frequency distribution**. I will not ask about the midrange. Understand **left and right skewing** of data sets. [STAT \(\rightarrow\) CALC \(\rightarrow\) 1-VarStats]

3–3 Know the connection between standard deviation and variance, but I will ask more about **standard deviation**. Be able to **calculate** the standard deviation from data and from a frequency distribution. What does the standard deviation measure? Be familiar with the **Range Rule of Thumb**, the **Empirical Rule** (see how they are similar and how they are different, and what the respective requirements are). Notice that the percentages for the Empirical Rule are not on the “Formulas and Tables” sheet. **Chebyshev’s Theorem** may appear (also not on formula sheet). The problem will be clear about which of these three tools to use.

3–4 Be able to find **z-scores**. Use them to identify unusual data values. Be able to find **quartiles**.

3–5 Be able to **construct** (using the **5-number summary**), **interpret**, and **compare** boxplots.

Check out the “Chapter Review” at the end of Chapter 3. You might try the following exercises: #1 (though I won’t put a data set this large on the exam), 2 – 8

**Chapter 4 Probability**

4–2 Remember the basic rule for a probability: 

\[ P(A) = \frac{\text{# ways A can occur}}{\text{total # of outcomes}} \]

**Vocabulary** here. Good material for multiple choice! I will not ask about odds.

4–3 Know when/how to use the **addition rule** (OR), especially when looking at **tables of data**.

4–4 Understand **conditional probability** and **independence of events**. Be able to use the **multiplication rule** correctly. Again be able to calculate probabilities from a **table**.

4–5 As above – more details about the **multiplication rule**. Also be able to use **complements**. Be able to do a **redundancy** problem.

4–7 Our basic counting tool is the **factorial** \(n! = n(n-1)(n-2)\ldots(2)(1)\). This gives the number of ways to arrange \(n\) items. We then use this tool when finding certain probabilities: **permutations** when order matters, and **combinations** when order does not matter. Use MATH \(\rightarrow\) PRB on the calculator for all three of these calculations.

Again, see the “Chapter Review”. Try the following Review Exercises: # 1 – 8, 10, 11, 14, 16

See also the relevant **instructor videos** for chapter 4.