

STRENGTH IN NUMBERS BRIDGE CLASS

STATISTICS – PRINCIPLES AND APPLICATIONS

TEXTBOOK – *THE PRACTICE OF STATISTICS*, BY STARNES, TABOR, YATES AND MOORE. FIFTH EDITION. **THIS IS THE TEXTBOOK USED FOR AP STATISTICS IN NEEDHAM.**

Statistics is the study of how to make good decisions based on limited information. We might want to know, for example, how tall an “average” person is. The usual way of calculating an “average” is to add up all the numbers and then divide by how many measurements we had. But it’s really impossible to measure *everyone’s* height. It turns out that in this case, it’s ok to measure the heights of a certain portion of the population, called a “sample,” and then infer that the average height of that sample is a pretty good estimate of the population’s height. Statistics will make precise the idea of *how many* people (and *what type* of people) we need to measure if we want to be able to confidently state an average height for the population, as well as *how confident* we can be that the average thus calculated will represent the entire population.

Statistics is an extremely useful class! Something frustrating about most math classes is that they lie to you about how useful they are. Although all math is worth learning simply because it’s true (the most excellent possible reason!), it can be annoying to deal with the double-talk of “usefulness” when the stuff you’re learning clearly has nothing to do with the real world. You won’t exactly use statistics in your everyday life, but it *will* teach you how to intelligently process the type of information you encounter in your everyday life. In this sense, you will have the same type of benefit from studying statistics that you will from studying physics: an increased understanding of the world around you.

There is some background that you will need for this class, but it isn’t the same level of background as you might need for some other high-level classes. Most of the effort in this class won’t be in algebra, but in reasoning. Since statistics involves lots of complicated number-crunching, we’ll actually be using your calculator a lot. The way we approach these problems will be using the built-in statistical functions of the TI-84 Plus CE calculator. **Yes, you read that right – this is a class where it is *expected* that a calculator will do a lot of the heavy lifting for you!** You, on the other hand, will need to perform the human tasks of interpreting data, judging whether something makes sense, and making decisions based on statistical output. Because statistics does involve thinking probabilistically, we will spend at least some time covering the basic rules of probability, but in terms of math background all you will really need is Algebra 2. **By the end of this class, you will have a solid background in all the basic topics of AP Statistics.**

Class number	Topics	Book Sections
1	Single-variable data; categorical and quantitative measurements	1.1-1.3
2	Data distributions; the normal distribution	2.1-2.2
3	Two-variable data; correlation; least-squares regression	3.1-3.2
4	Sampling; surveys; experiments	4.1-4.3
5	Sampling cont’d	4.1-4.3
6	Intro to probability and counting methods	5.1

Class number	Topics	Book Sections
7	Probability cont'd; conditional probability; independence	5.2-5.3
8	Random variables, discrete and continuous; transformations and combinations	6.1-6.2
9	Binomial and geometric random variables; general questions and catch-up	6.3
10	Sampling distributions; representative and non-representative samples; possible errors in data collection; sample proportions	7.1-7.2
11	Sample means; intro to confidence intervals	7.3, 8.1
12	More on confidence intervals; estimating proportions and means; the t -distribution	8.2-8.3
13	Hypothesis testing; significance tests	9.1, 9.2
14	Tests about proportions and means	9.2-9.3
15	Comparing populations	10.1-10.2
16	Comparing distributions of categorical data; χ^2 distribution	11.1-11.2