

STATISTICS 7 - REVIEW FOR FIRST EXAM (CHAPTERS 1 TO 6)

Examples that illustrate each item are shown in red

H = Homework, F = Sample free response, M = Sample multiple choice

Know how to find, construct or calculate:

1. A two-way table (explanatory variable as rows) and corresponding conditional percents, H4.14
2. A bar chart comparing two groups or conditions, Discussion #1 project
3. All of the values in a five-number summary (median, quartiles, low and high), H2.48 (added part), F1(parts a, c), M12, M25
4. Range and interquartile range, F1d
5. A stem and leaf plot, H2.48
6. A bell-shaped curve with the Empirical Rule percentages marked, H2.96, F4a
7. A standardized score, given a value, mean and standard deviation, H2.130, F4b, H2.104
8. A predicted (or estimated) value of y, given a regression equation and an x-value, H3.24c, H3.98d, F8b
9. The residual for a given individual, given that individual's values and a regression equation, H3.24d, F8c
10. Risk, relative risk, increased risk, odds and odds ratio, H4.18, M19 to 21
11. Expected counts for a chi-square test (compute and interpret), H15.12, F5b, M28
12. The conclusion for a hypothesis test, based on p-value, H4.49, H4.50, H15.10, H15.12, F5c
13. (Conservative) margin of error; 95% confidence interval, H5.30, F6, M10

Understand:

1. Reasons for outliers and what to do about them, H2.42b, F1b
2. How outliers affect various measures like mean, median, range, interquartile range, H2.72, F1d, M11
3. How to interpret a boxplot and side-by-side boxplots, None; see Lecture 2
4. Various shapes, how to recognize them and the influence on the mean versus median, M13, M24, H2.42, H2.48
5. The concept of standard deviation and how it is used for bell-shaped curves, F4b, H2.96, H2.128
6. How standard deviation and range are related for bell-shaped curves, F3, M13
7. What a standardized score represents and how it is useful, H2.130, F4b
8. How to determine which is the explanatory variable and which is the response variable, M1, F2b, H4.14
9. A deterministic relationship versus a statistical relationship (Lecture 4)
10. How to interpret a scatter plot - look for linear trend (or not) and outliers, H3.98a
11. How to interpret correlation and r^2 , and how correlation relates to slope (same sign), F8a, M15, H3.42, 3.48
12. How to interpret the slope and intercept in a regression equation and when they are useful (or not), F8d, M18, H3.18a, H3.24, H3.98
13. The two purposes for which regression is used, and when each is used (predicting y for an individual x or estimating the mean of all y's at a given value of x), M17
14. The concept of the "least squares" line, Lecture 4, H3.48
15. How different types of outliers influence correlation and the regression equation, M16, applets on web
16. How combining groups distorts correlation and regression (Lecture 5)
17. Interpretations of correlation or relationship, H3.42, M14, M27
18. Simpson's Paradox, H4.36
19. How you can be misled by statistics about risk (pages 120-122), M22
20. The purpose of hypothesis testing, M29, H15.10
21. How to write the hypotheses for a chi-square test, F5a, H415.10, 15.12
22. The interpretation of a p-value, H4.49, 4.50, 15.10bc
23. The possible conclusions for hypothesis tests, and why the null hypothesis should not be accepted, F5c, M29, H4.49, 4.50, 15.10, 15.12

24. How the sample size affects the results of a hypothesis test (pages 131-132), [H4.49](#), [4.50](#), [H15.10](#)
25. Types of samples and the advantages and disadvantages of them; when results can be extended to a population, [M7](#)
26. How to interpret a confidence *interval* and a confidence *level*, [H5.30](#)
27. Sources of bias in surveys and samples, [M8](#), [H5.68](#)
28. Observational studies versus randomized experiments, the role of confounding variables and what conclusions can be made (cause-and-effect or not), [H1.14](#), [H1.16](#), [F2a](#), [M3](#), [M5](#), [M27](#)
29. What defines a confounding variable and why they are more of a problem in observational studies, [M6.6](#), [F2c](#), [M2](#), [H1.16](#), [H3.74](#)
30. Principles of good experiments: randomization, replication, blinding, blocking, placebo, control group, [F7](#), [\[Chapter 6\]](#)
31. What is meant by a “treatment” in an experiment, [M4](#)
32. Issues related to observational studies: retrospective, prospective, case-control, [F6.38](#)
33. Overcoming difficulties encountered in experiments and observational studies (Section 6.4), [Lecture 9](#)