

STATISTICS 13 - REVIEW FOR FIRST EXAM (CHAPTERS 1 TO 6)

Know how to find, construct or calculate:

1. A two-way table (explanatory variable as rows) and corresponding conditional percents
2. A bar chart comparing two groups or conditions
3. All of the values in a five-number summary (median, quartiles, low and high)
4. Range and interquartile range
5. A boxplot and side-by-side boxplots
6. A stem and leaf plot
7. A bell-shaped curve with the Empirical Rule percentages marked
8. A standardized score, given a value, mean and standard deviation
9. A predicted (or estimated) value of y , given a regression equation and an x -value
10. The residual for a given individual, given that individual's values and a regression equation
11. Risk, relative risk, odds and odds ratio
12. Expected counts for a chi-square test (compute and interpret)
13. The chi-square statistic for a 2×2 contingency table
14. The conclusion for a hypothesis test, based on the p -value
15. Margin of error and 95% confidence interval

Understand:

1. Using percents versus numbers when comparing responses for two groups
2. Reasons for outliers and what to do about them
3. How outliers affect various measures like mean, median, range, interquartile range
4. Various shapes, how to recognize them and the influence on the mean versus median
5. The concept of standard deviation and how it is used for bell-shaped curves
6. What a standardized score represents and how it is useful
7. How to determine which is the explanatory variable and which is the response variable
8. A deterministic relationship versus a statistical relationship
9. How to interpret a scatter plot - look for linear trend (or not) and outliers
10. How to interpret correlation and r^2 , and how correlation relates to slope (same sign)
11. How to interpret the slope and intercept in a regression equation
12. 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)
13. The concept of the "least squares" line
14. How outliers influence correlation and the regression equation
15. How combining groups distorts correlation and regression
16. Simpson's Paradox
17. How you can be misled by statistics about risk (page 152)
18. The purpose of hypothesis testing
19. How to write the hypotheses for a chi-square test
20. The interpretation of a p -value
21. The possible conclusions for hypothesis tests, and why the null hypothesis should not be accepted
22. How the sample size affects the results of a hypothesis test (pages 162-163)
23. Observational studies versus randomized experiments, the role of confounding variables and what conclusions can be made (cause-and-effect or not)
24. Principles of good experiments: randomization, blinding, blocking, placebo, control group
25. Issues related to observational studies: retrospective, prospective, case-control
26. Types of samples and the advantages and disadvantages of them
27. Sources of bias in surveys and samples
28. Overcoming difficulties encountered in experiments and observational studies (Section 3.5)
29. Interpretations of an observed relationship (Section 5.5)