

Study Guide, Chapters 1–5
Basic Practice of Statistics, David S. Moore, 4th Edition
Davidson and Gardner, Spring 2009

Chapter 1. Picturing Distributions with Graphs

Departmental “Skills and Knowledge” Goals. The “Math 1530 Resource Page” (<http://www.etsu.edu/math/price/1530/1530link.htm>) lists the following goals.

1. Identify individuals and variables in a given story. (See Who? How many? What? Why? questions on page 4.)
2. Distinguish between Categorical and Quantitative variables.
3. Based on the nature of the variable, be able to decide which graph is appropriate for a given data set:
 - Histograms and Stemplots (Stem-and-Leaf display)?
 - Bar and/or Pie Charts?
 - Time Plots?
4. Understand what a histogram or stemplot tells you about the behavior of the variable. What is a bimodal or a skewed left or skewed right distribution telling you?

The topics we have emphasized in our class are: individuals, variables, categorical variable, quantitative variable and unit of measurement, distribution of a variable, pie chart, bar chart, histograms (overall pattern, deviations, shape, center, spread), outlier, symmetric and skewed distributions (Does it make sense to describe a bar chart as a skewed distribution? How about a histogram?), stemplots (stem, leaf, rounding, splitting stems), and time plots.

Chapter 2. Describing Distributions with Numbers

Departmental “Skills and Knowledge” Goals. The “Math 1530 Resource Page” lists the following goals.

1. Calculate and interpret the values of mean, median, quartiles, five number summary, standard deviation.
2. Draw a boxplot & compare several data sets in terms of center and spread by looking at the side by side boxplots.
3. Decide if an observation is an outlier using the 1.5 IQR rule.
4. Relate the skewness of the distribution to the relative position of the mean and the median.

5. Relate the standard deviation with a histogram.

Also you should be aware of how extreme observations affect numerical summaries.

The topics we have emphasized in our class are: mean, summation notation (Σ), median (for an even and an odd number of data points), compare the mean and median, “resistant”, range, quartiles (Q_1 and Q_3), five number summary, boxplot, interquartile range, the $1.5 \times IQR$ rule for outliers, variance, and standard deviation.

Chapter 3. The Normal Distributions

Departmental “Skills and Knowledge” Goals. The “Math 1530 Resource Page” lists the following goals.

1. Know what is a density curve and what is the total area under it.
2. Sketch the density curve given the mean and standard deviation of a normal distribution.
3. Apply the 68–95–99.7 rule.
4. Calculate z -scores (‘standardization’).
5. Find the area (proportions & percentiles) to the left or right of a given value of x or z .
6. Given an area (to the left or the right) under the normal curve, find the value of z (and x).
7. Use your knowledge of the normal distribution to solve word problems (example: exercises 3.20–3.22).

The topics we have emphasized in our class are: density curves, area as probability, comparing mean and median, normal distributions $N(\mu, \sigma)$, the 68–95–99.7 rule, the Standard Normal Distribution $N(0, 1)$, standard value (z -score), percentile, cumulative proportions, and using the Standard Normal Table (Table A) both “forwards” and “backwards.”

Chapter 4. Scatterplots and Correlation

Departmental “Skills and Knowledge” Goals. The “Math 1530 Resource Page” lists the following goals.

1. Know for what type of variables r can be calculated, its main properties and limitations, and how to interpret it.
2. Interpret a scatter plot and its relation with the value of r .

The topics we have emphasized in our class are: response variable, explanatory variable, scatterplots, positive and negative association, linear relationships, and correlation and its interpretation.

Chapter 5. Regression

Departmental “Skills and Knowledge” Goals. The “Math 1530 Resource Page” lists the following goals.

1. Know how to interpret the value of the slope (don’t forget the units), and the intercept (when interpretation is appropriate).
2. Understand the least square principle and know how to calculate (using computer or calculator) the estimated value of slope and intercept.
3. Know what residuals are and be able to interpret residual plots.
4. Know how to evaluate a model using r^2 .
5. Be familiar with the notion of outliers, influential data, lurking variable, extrapolation.
6. Understand that association does not imply necessarily a cause-effect relationship.
7. Be aware of the dangers of extrapolation and the possible existence of lurking variables.

The topics we have emphasized in our class are: least squares regression line and the idea behind it, interpretation of the slope and r^2 , residuals, influential observations, lurking variables, and association versus causation.

What You Need for the Exam

You will need a calculator, a number 2 pencil, and knowledge of the topics listed above. You will be given a copy of the Standard Normal Distribution (Table A), scratch paper, and a scan-tron. All questions will be multiple choice with five choices and the test will consist of approximately 40 questions. Sources of the questions will include (but may not be limited to) the online-posted sample departmental finals, chapter quizzes, daily quizzes, examples from the book, examples from the in-class notes, and exercises from the book. This exam will determine 25% of your semester grade.

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