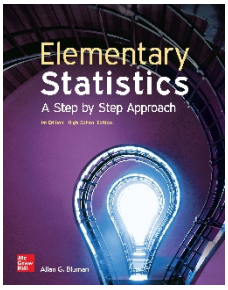


# *Elementary Statistics: A Step by Step Approach*
# High School Edition, 1e
**Bluman**

## Correlation to the Common Core State Standards for Mathematics: Statistics and Probability

| **CCSS for Mathematics: Statistics and Probability** | | **Elementary Statistics, Page Numbers** |
|---|---|---|
| **Interpreting Categorical and Quantitative Data (S-ID)** | | |
| | 1. Represent data with plots on the real number line (dot plots, histograms, and box plots). | Histogram: Chapter 2, p. 64-67, p. 71-76, p. 107,<br>*Apply the Concepts* 2-2, p. 77<br>*Exercises, p.* 78-79, 1-10<br>*Using Technology, p.*80-83<br>Practice 2-3, p. 103, 1<br>Chapter 2, Review, p. 110-112, 6, 7, 13<br>Dot Plot: p. 84, p. 92-93<br>Practice 2-3, p. 103-104, 7, 8<br>Chapter 2 Review, p. 112, 13<br>Box Plot: p. 182- 186<br>Practice 3-4, p. 188, 5, 6, 7, 8<br>*Using Technology,* p. 189-190<br>Chapter 3 Review, p. 199, 18, 19 |
| | 2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets. | Median, Mean: Chapter 3, p. 117-122, p. 123-124, p. 129<br>Example 4, p. 123<br>Example 5, p. 124<br>Example 14, p. 130<br>*Applying Concepts* 3-1, p. 133<br>Practice p. 134-135, 1-17<br>Interquartile Range, Chapter 3, p. 171<br>Practice 3-3, p. 177, 13, 14<br>Standard Deviation: Chapter 3, p.138-140, p. 143-144, p. 145, p. 146-147, p. 150<br>Example 4, p. 140-141<br>Example 5, p. 142-143<br>Example 6, p. 144-145<br>Example 7, p. 145-146<br>Example 8, p. 147-149<br>Example 9, p. 151<br>Example 10, p. 151<br>Practice 3-2, p. 158-159, 1, 4-15<br>Chapter 3 Review, p. 196-197, 1-9 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| | a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. *Use given functions or choose a function suggested by the context. Emphasize linear, quadratic, and exponential models.* | Using a Regression Line to Make a Prediction: Chapter 10, p. 693-694<br>Example 3, p. 694<br>Non-Linear Relationships: Chapter 10, p. 695<br>Example 4, p. 695-697<br>Example 5, p. 697-698<br>Practice 10-2, p. 702-703, 1-15 |
| | b. Informally assess the fit of a function by plotting and analyzing residuals. | Residual Plots: Chapter 10, p. 712<br>Example 2, p. 712-713<br>Example 3, p. 714 |
| | c. Fit a linear function for a scatter plot that suggests a linear association. | Regression Line Equation: Chapter 10, p. 689-690<br>Example 1, p. 691-692<br>Example 2, p. 692<br>Practice 10-2, p. 702-703, 6-15 |
| **Interpreting Categorical and Quantitative Data (S-ID)** | | |
| Interpret linear models | 7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. | *Statistics All Around Us: Use Statistics* Chapter 10, p. 694-695<br>*Exercising Care When Using Regression* Chapter 10, p. 698<br>*Applying the Concepts* 10-2, p. 701 |
| | 8. Compute (using technology) and interpret the correlation coefficient of a linear fit. | *Using Technology Correlation and Regression* Chapter 10, p. 704-708 |
| | 9. Distinguish between correlation and causation. | Correlation and Causation: Chapter 10, p. 683-684 |
| **Making Inferences and Justifying Conclusions (S-IC)** | | |
| Understand and evaluate random processes underlying statistical experiments | 1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population. | Samples and Types of Bias, Chapter 11, p. 746-748<br>Random Sample: Chapter 11, p. 747-748<br>Example 1, p. 748-750<br>Systematic Sampling: Chapter 11, p.750<br>Example 2, p. 751<br>Stratified Sampling, Chapter 11, p. 752<br>Example 3, p. 753-755<br>Cluster Sampling, Chapter 11, p. 755-756<br>Other Types of Sampling Techniques, Chapter 11, p. 756-757<br>Practice 11-1, p. 758-759, 1-11<br>Chapter 11 Review, p. 781-782, 1-5 |
| | 2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?* | Simulation: Chapter 11, p. 765-767<br>Example 1, p. 767-768<br>Example 2, p. 768-769<br>Example 3, p. 769-770<br>Example 4, p. 771-772<br>Example 5, p. 772-773<br>*Applying the Concepts* 11-3, p. 773<br>Practice 11-3, p. 774, 7-17 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| Make inferences and justify conclusions from sample surveys, experiments, and observational studies | 3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each. | Surveys: Chapter 11, p.756- 757, p. 761-763<br>Observational Studies: Chapter 1, p.28<br>Experimental Studies: Chapter 1, p. 29-30<br>Factors that Can Affect the Outcome of a Study: Chapter 1, p. 30-31<br>Drawing Conclusions: Chapter 1, p. 31-33<br>*Applying Concepts 1-4* , Chapter 1, p.36<br>Practice 1-4, p. 37, 7, 8<br>Chapter 1 Review, p. 45, 19, 20 |
| | 4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling. | Chapter 3, p. 143-144<br>Example 6, p. 144-145 |
| | 5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant. | Chapter 3, p. 150<br>Example 9, p. 151<br>Example 10, p. 151-152<br>Practice 3-2, p. 158-160, 3, 8, 15, 20, 21 |
| | 6. Evaluate reports based on data. | *Applying the Concepts* 1-1, p. 9<br>Practice 1-1, p. 10, 18, 19<br>*Applying the Concepts* 1-2, p. 17<br>*Applying the Concepts* 1-4, p. 36<br>Practice 1-4, p. 37, 18<br>*Applying the Concepts* 2-3, p. 102 |
| **Conditional Probability and the Rules of Probability (S-CP)** | | |
| **Understand independence and conditional probability and use them to interpret data** | 1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”). | Sample Space: Chapter 4, p. 202, p. 204<br>Union and Intersection: *Historical Note,* p. 228<br>Example 1, p. 203<br>Example 2, p. 203<br>Example 3, p. 204<br>Example 4, p. 204-206<br>Complement of an Event: Chapter 4, p. 212. p. 213-214<br>Example 10, p. 212<br>Example 11, p. 214 |
| | 2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent. | Independent Events: Chapter 4, p. 235<br>Example 1, p. 235-236<br>Example 2, p. 236<br>Example 3, p. 237<br>Example 4, p. 238 |
| | 3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*. | Conditional Probability: Chapter 4, p. 244-245 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| **Understand independence and conditional probability and use them to interpret data (cont'd)** | 4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.* | Finding a Conditional Probability Given Frequencies: Chapter 4, Example 11 p. 247-249 |
| | 5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.* | Conditional Probability: Chapter, 4 p. 239, p. 244 |
| **Conditional Probability and the Rules of Probability (S-CP)** | | |
| **Use the rules of probability to compute probabilities of compound events in a uniform probability model** | 6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model. | Example 9, p. 246<br>Example 10, p. 246-247<br>Practice 4-3, p. 253-254, 2-23 |
| | 7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model. | Addition Rule: Chapter 4, p. 225, p. 227-228<br>Example 3, p. 225-226<br>Example 4, p. 226<br>Example 5, p. 227<br>Example 6, p. 228-229<br>Example 7, p. 229<br>Example 8, p. 229-230<br>Practice 4-2, p. 232-233, 3-14<br>Chapter 4 Review, p. 282-283, 5-8 |
| | 8. (+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B\|A) = P(B)P(A\|B), and interpret the answer in terms of the model. | Multiplication Rule: Chapter 4, p. 235, p. 238-239<br>Example 1, p. 235-236<br>Example 2, p. 236<br>Example 3, p. 237<br>Example 5, p. 239-240<br>Example 6 p. 240<br>Practice 4-3 p. 253-254, 2-23<br>Chapter 4 Review, p. 283-284, 9-14 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| **Use the rules of probability to compute probabilities of compound events in a uniform probability model** | 9. (+) Use permutations and combinations to compute probabilities of compound events and solve problems. | Permutations: Chapter 4, p. 260-261, p. 261-262, p. 262-263<br>Example 5, p. 261<br>Example 6, p. 261<br>Example 7, p. 262<br>Example 8, p. 262<br>Example 9, p. 263<br>Combinations: Chapter 4, p. 263-264, p. 264<br>Example 10, p. 264<br>Example 11, p. 265<br>Example 12, p. 265<br>Example 13, p. 265-266<br>Practice 4-4, p. 268-269, 1-31<br>Probability and Counting Rules: Chapter 4, p. 272<br>Example 1, p. 272<br>Example 2, p. 272-273<br>Example 3, p. 273<br>Example 4, p. 274<br>Example 5, p. 274-275<br>*Applying Concepts,* 4-5 p. 276<br>Practice 4-5, p. 277, 1-8<br>Chapter 4 Review, p. 284-285, 15-22 |
| **Using Probability to Make Decisions (S-MD)** | | |
| **Calculate expected values and use them to solve problems** | 1. (+) Define a random variable for a quantity of interest by assigning a numerical value to each event in a sample space; graph the corresponding probability distribution using the same graphical<br>displays as for data distributions. | Random Variables and Probability Distributions: Chapter 5, p.288-290<br>Example 1, p. 290<br>Example 2, p. 290-291<br>Example 3, p. 291-292<br>Practice 5-1, p. 296-297, 22-24 |
| | 2. (+) Calculate the expected value of a random variable; interpret it as the mean of the probability distribution. | Expected Value: Chapter 5, p. 305<br>Example 8, p. 306<br>Example 9, p. 306-307<br>Example 10, p. 307-308<br>*Applying the Concepts* 5-2, p. 309<br>Practice 5-2, p. 310, 1-14<br>Chapter 5 Review, p. 356-237 , 6-10 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| **Calculate expected values and use them to solve problems (cont'd)** | 3. (+) Develop a probability distribution for a random variable defined for a sample space in which theoretical probabilities can be calculated; find the expected value. *For example, find the theoretical probability distribution for the number of correct answers obtained by guessing on all five questions of a multiple-choice test where each question has four choices, and find the expected grade under various grading schemes.* | Probability Distribution for a Random Variable: Chapter 5, p. 288-290<br>Example 1, p. 290<br>Example 2, p. 290-291<br>*Speaking of Statistics: Coins, Births and Other Random Events,* p. 293-294<br>*Applying the Concepts,* 5-1 p. 295<br>Practice 5-1, p. 296-297, 5, 22, 26-28<br>Expected Value: Chapter 5, p. 305<br>Practice 5-2, p. 310, 10-14<br>Binomial Distribution: Chapter 5, p. 314-316<br>Example 2, p. 316<br>Example 10, p. 324-325<br>Practice 5-3, p. 327, 5<br>Chapter 5 Review, p. 356-357, 5 |
| | 4. (+) Develop a probability distribution for a random variable defined for a sample space in which probabilities are assigned empirically; find the expected value. *For example, find a current data distribution on the number of TV sets per household in the United States, and calculate the expected number of sets per household. How many TV sets would you expect to find in 100 randomly selected households?* | Probability Distribution for a Random Variable: Chapter 5, p. 288-290<br>Example 3, p. 291-292<br>*Speaking of Statistics: Coins, Births and Other Random Events,* p. 293-294<br>*Applying the Concepts* 5-1, p.295<br>Practice 5-1, p. 296-297, 18-21, 23, 24, 25<br>Expected Value: Chapter 5, p. 305<br>Practice 5-2, p. 310, 1-5, 12-14<br>Binomial Distribution: Chapter 5, p. 314-316<br>Example 3, p. 316-317<br>Example 4, p. 318<br>Example 5, p. 319<br>Example 6, p. 320<br>Example 7, p. 320-322<br>Example 8, p. 322-323<br>Example 9, p. 323-324<br>Example 11, p. 325<br>Practice 5-3, p. 327-328, 4, 6-8. 10-16<br>Chapter 5 Review, p. 356-357, 3, 4, 6, 7, 12-17 |
| **Using Probability to Make Decisions (S-MD)** | | |
| **Use probability to evaluate outcomes of decisions** | 5. (+) Weigh the possible outcomes of a decision by assigning probabilities to payoff values and finding expected values. | (addressed in the two points below) |
| | a. Find the expected payoff for a game of chance. *For example, find the expected winnings from a state lottery ticket or a game at a fast food restaurant.* | Chapter 5, Example 8, p. 306<br>Example 9, p. 306-307<br>Practice 5-2, p. 310, 6-8<br>Chapter 5 Review, p. 356-357, 8, 9, 10 |

| CCSS for Mathematics: Statistics and Probability | | Elementary Statistics, Page Numbers |
|---|---|---|
| **Use probability to evaluate outcomes of decisions (cont'd)** | b. Evaluate and compare strategies on the basis of expected values. *For example, compare a high-deductible versus a low-deductible automobile insurance policy using various, but reasonable, chances of having a minor or a major accident.* | Chapter 5, Example 10, p. 307-308<br>Practice 5-2, p. 310, 9<br>Chapter 5 Review, p. 356-357, 3, 4, 6-9, 12-17 |
| | 6. (+) Use probabilities to make fair decisions (e.g., drawing by lots, using a random number generator). | Chapter 5, Example 8, p. 306<br>Example 10, p. 307-308 |
| | 7. (+) Analyze decisions and strategies using probability concepts (e.g., product testing, medical testing, pulling a hockey goalie at the end of a game). | Chapter 5, Example 9, p. 306-307<br>Example 10, p. 307-308<br>Practice 5-2, p. 301, 7-9 |