

Statistics with Basic Math Corequisite Support: A Targeted Review



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Source	Author(s) (Text or Video)	Title(s)	Link (where applicable)
OpenStax Text	Lynn Marecek, Santa Ana College MaryAnne Anthony-Smith, Formerly of Santa Ana College	Prealgebra	OpenStax
Mathispower4u Video	James Sousa		Mathispower4u Videos

Source	Author(s) (Text or Video)	Title(s)	Link (where applicable)
OpenStax	Barbara Illowsky, De Anza College Susan Dean, De Anza College	Introductory Statistics	OpenStax
www.onlinestatbook.com	David Lane Developed by Rice University, University of Houston Clear Lake, and Tufts University	Online Statistics Education: An Interactive Multimedia Course of Study	Online Stat Book
JB Statistics	Jeremy Balka, University of Guelph		YouTube Channel

Alta Prealgebra was developed to meet the scope and sequence of a typical one-semester prealgebra course. To develop the course, Knewton used three main sources of content: Openstax, videos created by a math Professor we have partnered with, and a team of internal and external Subject Matter Experts. The SMEs come from diverse backgrounds and are all academics in the field of mathematics.

Alta Prealgebra has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our OpenStax instructional texts, our videos, and a network of SMEs, we were able to solicit ideas from math instructors and students. Alta Prealgebra covers the typical breadth of prealgebra topics, and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

Alta Statistics was developed to meet the scope and sequence of an introductory statistics course. To develop the course, Knewton used four main sources of content: OpenStax, Rice University's Online Stat Book, videos created by a Statistics professor at the University of Guelph, and a team of Subject Matter Experts (SMEs). The SMEs come from diverse backgrounds and are all accomplished academics in the field of statistics. Alta Statistics covers the breadth of statistics topics, and also provides the necessary depth to ensure the course is manageable and engaging for instructors and students alike.

Alta Statistics has two instructional sequences for every learning objective, giving students multiple opportunities to learn new concepts. Between our text, video, and original SME content, we were able to solicit ideas from statistics instructors and students at all levels of higher education, from community colleges to Ph.D- granting universities. Alta Statistics provides a level of academic rigor, while also promoting relevance and accessibility for students. Knewton has added current and relevant contexts and examples to instruction and assessments.

Basic Math Corequisite | Table of Contents

Chapter 1: Whole Numbers

1.1 Introduction to Whole Numbers

- Place Value and Rounding Whole Numbers
 - Identify counting numbers and whole numbers
 - Model whole numbers and identify the place value of a digit
 - Use place value to name and write whole numbers
 - Round whole numbers

1.2 Add Whole Numbers

- Adding Whole Numbers
 - Use addition notation
 - Model addition of whole numbers
 - Add whole numbers without models
 - Add whole numbers that may require carrying
- Applications of Adding Whole Numbers
 - Translate word phrases involving addition to math notation
 - Add whole numbers in applications

1.3 Subtract Whole Numbers

- Subtracting Whole Numbers
 - Use subtraction notation
 - Model subtraction of whole numbers
 - Subtract whole numbers
 - Subtract whole numbers that may require borrowing
-

- Applications of Subtracting Whole Numbers
 - Translate word phrases involving subtraction to math notation
 - Subtract whole numbers in applications

1.4 Multiply Whole Numbers

- Multiplying Whole Numbers
 - Use multiplication notation
 - Model multiplication of whole numbers
 - Multiply whole numbers by single digit numbers
 - Multiply whole numbers by multi-digit numbers
- Applications of Multiplying Whole Numbers
 - Translate word phrases involving multiplication to math notation
 - Multiply whole numbers in applications

1.5 Divide Whole Numbers

- Dividing Whole Numbers
 - Use division notation
 - Model division of whole numbers
 - Divide whole numbers by single digit numbers
- Dividing Whole Numbers with Long Division
 - Divide whole numbers using long division
 - Divide whole numbers using long division where there may be a remainder
- Applications of Dividing Whole Numbers
 - Translate word phrases involving division to math notation
 - Divide whole numbers in applications

Chapter 2: The Language of Algebra

2.1 Use the Language of Algebra

- Variables, Expressions, and Equations
 - Use variables and algebraic symbols
 - Use variables and algebraic symbols to describe inequalities
 - Identify expressions and equations
- Exponents and Order of Operations
 - Use exponent notation and evaluate exponential expressions involving whole numbers
 - Simplify expressions using the order of operations

2.2 Evaluate, Simplify, and Translate Expressions

- Evaluating and Simplifying Expressions
 - Evaluate algebraic expressions
 - Identify terms, coefficients, and like terms
 - Simplify expressions by combining like terms
-

- Translating Phrases to Algebraic Expressions
 - Translate word phrases to algebraic expressions
 - Write word phrases from applications as algebraic expressions

2.3 Solving Equations Using the Subtraction and Addition Properties of Equality

- The Subtraction and Addition Properties of Equality
 - Determine whether a number is a solution of an equation
 - Model the Subtraction Property of Equality
 - Solve equations using the Subtraction Property of Equality
 - Solve equations using the Addition Property of Equality
- Translating Phrases to Algebraic Equations and Solving
 - Translate word phrases to algebraic equations
 - Translate to an equation and solve

2.4 Find Multiples and Factors

- Identify Multiples and Use Divisibility Tests
 - Identify multiples of numbers
 - Use common divisibility tests
- Find Factors and Identify Prime and Composite Numbers
 - Find all the factors of a number
 - Identify prime and composite numbers

2.5 Prime Factorization and the Least Common Multiple

- Prime Factorization and the Least Common Multiple
 - Find the prime factorization of a composite number using a factor tree
 - Find the prime factorization of a composite number using the ladder method
 - Find the least common multiple (LCM) of two numbers

Chapter 3: Integers

3.1 Introduction to Integers

- Integers on the Number Line and Opposites
 - Locate positive and negative numbers on the number line (*15)
 - Order positive and negative numbers
 - Find opposites
 - Translate word phrases to expressions with integers
- Introduction to Absolute Value
 - Understand absolute value
 - Simplify expressions using the order of operations with absolute value

3.2 Add Integers

- Adding Integers and Variable Expressions Involving Integers
 - Model addition of integers
 - Simplify expressions involving addition with integers
 - Evaluate variable expressions involving addition with integers
-

- Adding Integers in Applications
 - Translate word phrases involving addition to algebraic expressions
 - Add integers in applications

3.3 Subtract Integers

- Subtracting Integers and Variable Expressions Involving Integers
 - Model subtraction of integers
 - Simplify expressions involving subtraction with integers
 - Evaluate variable expressions involving subtraction with integers
- Subtracting Integers in Applications
 - Translate word phrases involving subtraction to algebraic expressions
 - Subtract integers in applications

3.4 Multiply and Divide Integers

- Multiplying and Dividing Integers and Variable Expressions with Integers
 - Multiply two integers
 - Divide two integers
 - Simplify expressions involving multiplication or division with integers
 - Evaluate variable expressions involving multiplication or division with integers
- Multiplying and Dividing Integers in Applications
 - Translate word phrases involving multiplication or division to algebraic expressions

3.5 Solve Equations Using Integers and the Division Property of Equality

- The Subtraction and Addition Properties of Equality with Integers
 - Determine whether an integer is a solution of an equation
 - Solve equations with integers using the Addition and Subtraction Properties of Equality
- The Division Property of Equality
 - Model the Division Property of Equality
 - Solve equations using the Division Property of Equality
- Translating Phrases to Algebraic Equations with Integers and Solving
 - Translate to an equation with integers and solve

Chapter 4: Fractions

4.1 Visualize Fractions

- Introduction to Fractions, Improper Fractions, and Mixed Numbers
 - Understand the meaning of fractions
 - Model improper fractions and mixed numbers
 - Convert between improper fractions and mixed numbers
 - Finding Equivalent Fractions
 - Model equivalent fractions
 - Find equivalent fractions
-

- Ordering Fractions and Mixed Numbers
 - Locate fractions and mixed numbers on the number line (*37)
 - Order fractions and mixed numbers

4.2 Multiply and Divide Fractions

- Simplifying and Multiplying Fractions
 - Reduce a fraction to lowest terms
 - Multiply two fractions
- Reciprocals and Dividing Fractions
 - Find reciprocals
 - Divide two fractions

4.3 Multiply and Divide Mixed Numbers and Complex Fractions

- Multiplying and Dividing Mixed Numbers
 - Multiply mixed numbers
 - Divide mixed numbers
- Simplifying Complex Fractions and Order of Operations with Fractions
 - Translate phrases to expressions with fractions
 - Simplify a complex fraction
 - Simplify an expression written with a fraction bar

4.4 Add and Subtract Fractions with Common Denominators

- Adding and Subtracting Fractions with Common Denominators
 - Model fraction addition
 - Add fractions with a common denominator
 - Model fraction subtraction
 - Subtract fractions with a common denominator

4.5 Add and Subtract Fractions with Different Denominators

- Adding and Subtracting Fractions with Different Denominators
 - Find the least common denominator (LCD)
 - Convert fractions to equivalent fractions with the LCD
 - Add and subtract fractions with different denominators
- Combining Fraction Operations
 - Identify and use fraction operations
 - Use the order of operations to simplify complex fractions
 - Evaluate a variable expression with fractions

4.6 Add and Subtract Mixed Numbers

- Adding and Subtracting Mixed Numbers with Common Denominators
 - Model addition of mixed numbers with a common denominator
 - Add mixed numbers with a common denominator
 - Model subtraction of mixed numbers
 - Subtract mixed numbers with a common denominator
-

- Adding and Subtracting Mixed Numbers with Different Denominators
 - Add and subtract mixed numbers with different denominators

4.7 Solve Equations with Fractions

- Solve Equations with Fractions Using the Addition, Subtraction, and Division Properties of Equality
 - Determine whether a fraction is a solution of an equation
 - Solve equations with fractions using the Addition, Subtraction, and Division Properties of Equality
- Solve Equations with Fractions Using the Multiplication Properties of Equality
 - Solve equations using the Multiplication Property of Equality
 - Solve equations with a fraction coefficient using the Multiplication Property of Equality
 - Translate sentences involving fractions to equations and solve

Chapter 5: Decimals

5.1 Introduction to Decimals

- Naming Decimals and Converting Decimals to Fractions
 - Name decimals
 - Write decimals
 - Convert decimals to fractions or mixed numbers
- Ordering and Rounding Decimals
 - Locate decimals on the number line (*17)
 - Order decimals
 - Round a decimal

5.2 Decimal Operations

- Operations with Decimals
 - Add and subtract two decimals
 - Multiply two decimals
 - Divide decimals by a whole number
 - Divide a decimal by another decimal
- Operations with Decimals in a Money Application
 - Use decimals in money applications

5.3 Decimals and Fractions

- Converting Fractions to Decimals and Order of Operations with Decimals
 - Convert fractions to decimals
 - Order decimals and fractions
 - Simplify expressions involving decimals using the order of operations
 - Circumference and Area of Circles
 - Find the circumference and area of circles with pi as a decimal approximation
 - Find the circumference and area of circles with pi as a fractional approximation
-

5.4 Solve Equations with Decimals

- Solving Equations Involving Decimals
 - Determine whether a decimal is a solution of an equation
 - Solve equations with decimals
 - Translate sentences involving decimals to an equation and solve

5.5 Averages and Probability

- Finding the Mean, Median, and Mode of a Set of Numbers
 - Calculate the mean of a set of numbers
 - Find the median of a set of numbers
 - Find the mode of a set of numbers
- Calculating the Probability of an Event
 - Apply the basic definition of probability

5.6 Ratios and Rate

- Writing Ratios and Using Ratios in Applications
 - Write a ratio as a fraction
 - Use ratios in applications
- Unit Rates and Unit Prices
 - Write a rate as a fraction
 - Find unit rates
 - Find unit price
 - Translate phrases to expressions as rates or ratios

5.7 Simplify and Use Square Roots

- Evaluating, Estimating, and Approximating Square Roots
 - Evaluate square root expressions
 - Estimate square roots
 - Approximate square roots
- Simplifying Square Roots with Variables and Square Roots in Applications
 - Simplify a variable expression with square roots
 - Use a square root in applications

Chapter 6: Percents

6.1 Understand Percent

- Definition of Percent and Converting Percents
 - Use the definition of percent
 - Convert percents to fractions
 - Convert percents to decimals
 - Convert decimals and fractions to percents
-

6.2 Solve General Applications of Percent

- Percent Equations and Percent Increase and Decrease
 - Translate and solve a basic percent equation
 - Solve applications of percent
 - Find percent increase and percent decrease

6.3 Solve Sales Tax, Commission, and Discount Applications

- Using Percents with Sales Tax, Commission, and Discount Applications
 - Solve sales tax applications
 - Solve commission applications
 - Solve discount applications
 - Solve mark-up applications

6.4 Solve Simple Interest Applications

- Solving Simple Interest Applications
 - Use the simple interest formula
 - Solve a simple interest application

6.5 Solve Proportions and Their Applications

- Proportions and Applications Using Proportions
 - Use the definition of proportion
 - Solve proportions
 - Solve applications using proportions
- Writing and Solving Percent Proportions
 - Write percent equations as proportions
 - Translate and solve percent proportions

Chapter 7: The Properties of Real Numbers

7.1 Rational and Irrational Numbers

- Classifying Real Numbers
 - Identify rational numbers and irrational numbers
 - Classify different types of real numbers

7.2 Commutative and Associative Properties

- Simplifying Expressions with the Commutative and Associate Properties
 - Use the commutative and associative properties
 - Evaluate expressions using the commutative and associative properties
 - Simplify expressions using the commutative and associative properties

7.3 Distributive Property

- Simplifying Expressions with the Distributive Property
 - Simplify expressions using the distributive property
 - Simplify expressions involving fractions or decimals with the distributive property
 - Simplify expressions using the distributive property where a variable needs distributed
-

- Simplify expressions using the distributive property where a negative number needs distributed
- Evaluating Expressions with the Distributive Property
 - Use the distributive property as a step in the order of operations
 - Evaluate expressions using the distributive property

7.4 Properties of Identity, Inverses, and Zero

- Use the Properties of Identity, Inverses, and Zero to Simplify Expressions
 - Recognize the identity properties of addition and multiplication
 - Use the inverse properties of addition and multiplication
 - Use the properties of zero
 - Simplify expressions using the properties of identities, inverses, and zero

7.5 Systems of Measurement

- Unit Conversions in the US System
 - Make a unit conversion in the US system
 - Use mixed units in the US System
- Unit Conversions in the Metric System
 - Make a unit conversion in the metric system
 - Use mixed units in the metric system
- Unit Conversions Between the US and Metric System
 - Convert between the US and the metric systems of measurement
 - Convert between Celsius and Fahrenheit temperatures

Chapter 8: Solving Linear Equations

8.1 Solve Equations Using the Subtraction and Addition Properties of Equality

- Simplifying and Solving Equations Using the Subtraction and Addition Properties of Equality
 - Solve equations using the Subtraction and Addition Properties of Equality
 - Solve equations that need to be simplified using the Subtraction and Addition Properties of Equality
- Solving Application Problems with the Subtraction and Addition Properties of Equality
 - Translate an equation and solve using the Subtraction and Addition Properties of Equality
 - Translate and solve applications using the Subtraction and Addition Properties of Equality

8.2 Solve Equations Using the Division and Multiplication Properties of Equality

- Simplifying and Solving Equations Using the Division and Multiplication Properties of Equality
 - Solve equations using the Division and Multiplication Properties of Equality
 - Solve equations that need to be simplified using the Division and Multiplication Properties of Equality

8.3 Solve Equations with Variables and Constants on Both Sides

- A General Strategy for Solving Equations
 - Solve equations with constants on both sides
 - Solve an equation with variables on each side
-

- Solve an equation with variables and constants on both sides
- Solve equations using a general strategy

8.4 Solve Equations with Fraction or Decimal Coefficients

- Use a General Strategy for Solving Equations with Fractions
 - Solve equations with fraction coefficients
 - Solve equations with fraction coefficients and the distributive property
- Use a General Strategy for Solving Equations with Decimals
 - Solve equations with decimal coefficients
 - Solve equations with decimal coefficients and the distributive property

Chapter 9: Math Models and Geometry

9.1 Use a Problem Solving Strategy

- Introduction to Problem Solving and Number Problems
 - Use a problem solving strategy for word problems
 - Solve number problems
 - Solve number problems involving multiple numbers
 - Solve number problems involving consecutive integers

9.2 Solve Money Applications

- Solve Problems Involving Coins, Tickets, or Stamps
 - Solve a coin word problem
 - Solve a ticket or stamp word problem

9.3 Use Properties of Angles, Triangles, and the Pythagorean Theorem

- Solve Problems with Angle Measures and Similar Triangles
 - Use the definitions of supplementary and complementary angles to solve problems
 - Find the measures of angles of a triangle using properties
 - Use the properties of similar triangles to solve problems
- Solve Problems with the Pythagorean Theorem
 - Use the Pythagorean Theorem to find the length of a missing side of a right triangle
 - Use the Pythagorean Theorem to solve application problems

9.4 Use Properties of Rectangles, Triangles, and Trapezoids

- Find the Area and Perimeter of Rectangles
 - Understand linear, square, and cubic measure and the definition of area and perimeter
 - Solve problems involving the area and perimeter of rectangles
 - Use the area or perimeter of a rectangle to find the length or width of a rectangle when when one side is given in terms of another
 - Find the Area and Perimeter of Triangles
 - Solve problems involving the area and perimeter of triangles
 - Solve problems involving the area and perimeter of isosceles or equilateral triangles
-

9.5 Solve Geometry Applications with Circles and Irregular Figures

- Find the Area of Trapezoids
 - Use properties of trapezoids
- Area and Circumference of Circles and Area of Irregular Figures
 - Solve problems involving the area and circumference of circles
 - Find the area of irregular figures made from rectangles and triangles
 - Find the area of irregular figures made from circles and other shapes

9.6 Solve Geometry Applications with Volume and Surface Area

- Volume and Surface Area of Rectangular Solids and Spheres
 - Find volume and surface area of rectangular solids and cubes
 - Find volume and surface area of spheres
- Volume and Surface Area of Cylinders and Cones
 - Find volume and surface area of cylinders
 - Find volume of cones

9.7 Solve a Formula for a Specific Variable

- The Distance, Rate, and Time Formula and Solving for a Specific Variable
 - Use the distance, time, and rate formula
 - Solve a given formula for a specific variable
 - Solve a formula for y

Chapter 10: Polynomials

10.1 Add and Subtract Polynomials

- Names and Degrees of Polynomials
 - Identify polynomials, monomials, binomials, and trinomials
 - Determine the degree of polynomials
- Adding, Subtracting, and Evaluating Polynomials
 - Add or subtract monomials
 - Add or subtract polynomials
 - Evaluate a polynomial for a given value

10.2 Use Multiplication Properties of Exponents

- Simplifying Expressions with the Multiplication Properties of Exponents
 - Evaluate numerical expressions with exponents
 - Simplify expressions using the Product Property of Exponents
 - Simplify expressions using the Power Property of Exponents
 - Simplify expressions using the Product to a Power Property
 - Simplify expressions by applying several of the multiplication properties of exponents

10.3 Multiply Polynomials

- Multiplying Polynomials by Monomials
 - Multiply two monomials
 - Multiply a monomial by a polynomial
-

- Multiplying Binomials and Polynomials
 - Multiply a binomial by a binomial using the distributive property
 - Multiply a binomial by a binomial using the FOIL method
 - Multiply a trinomial by a binomial using the distributive property
- Multiplying Polynomials with the Vertical Method
 - Multiply polynomials using the vertical method

10.4 Divide Monomials

- Simplifying Expressions with the Division Properties of Exponents and Dividing Monomials
 - Simplify expressions using the Quotient Property of Exponents and the Zero Property of Exponents
 - Simplify an expression using the Quotient to a Power Property
 - Simplify expressions by applying several properties of exponents
 - Divide two monomials

10.5 Integer Exponents and Scientific Notation

- Integer Exponents
 - Use the definition of negative exponents
 - Simplify an expression with integer exponents
- Scientific Notation and Operations with Scientific Notation
 - Convert decimal notation to scientific notation
 - Convert scientific notation to decimal form
 - Multiply or divide using scientific notation

10.6 Introduction to Factoring Polynomials

- Greatest Common Factors of Monomials and Polynomials
 - Find the GCF of two or more expressions
 - Factor the greatest common factor from a polynomial
 - Factor a greatest common factor with a negative coefficient from a polynomial

Chapter 11: Graphs

11.1 Use the Rectangular Coordinate System

- Plotting Points on a Rectangular Coordinate System
 - Plot points on a rectangular coordinate system (*31)
 - Identify the quadrants of points and plot points with a coordinate of zero (*14)
 - Identify points on a graph
 - Solutions of Linear Equations
 - Verify solutions to an equation in two variables
 - Complete a table of solutions to a linear equation
 - Find solutions to linear equations in two variables
-

11.2 Graphing Linear Equations

- Graph Linear Equations and Vertical and Horizontal Lines by Plotting Points
 - Recognize the relation between the solutions of an equation and its graph
 - Graph a line by plotting points
 - Graph a linear equation with x and y on the same side by plotting points
 - Graph vertical or horizontal lines (*2)

11.3 Graphing with Intercepts

- Graph Linear Equations with Intercepts
 - Identify the intercepts on a graph
 - Find the intercepts from an equation of a line
 - Graph a line using the intercepts (*2)
 - Choose the most convenient method to graph a line

11.4 Understand Slope of a Line

- Understanding Slope
 - Use geoboards to model slope
 - Find the slope of a line from its graph
 - Find the slope of horizontal or vertical lines
 - Graphing Lines with Slope and Applications of Slope
 - Find the slope of a line between two points by using the slope formula
 - Graph lines given a point and the slope (*2)
 - Solve slope applications
-

Statistics V2 | Table of Contents

Chapter 1: Sampling and Data

1.1 Statistics Terminology and Study Designs

- Sampling and Parameters
 - Understand the definitions of population, sampling, statistic, parameter, and data
 - Identify stratified, cluster, systematic, and convenience sampling
- Statistical Study Design
 - Determine whether a study is observational or an experiment and appropriate use cases
 - Identify and describe the steps in the statistical analysis process

1.2 Sampling Errors, Bias and Measures of Data

- Sampling Errors and Bias
 - Identify sampling errors and bias
 - Identify situations in which statistics can be misleading
- Variables and Measures of Data
 - Identify explanatory and response variables in an experiment
 - Identify levels of measurement of data
 - Define and distinguish between qualitative, quantitative, discrete, and continuous variables

Chapter 2: Descriptive Statistics

2.1 Histograms and Frequency Tables

- Frequency Tables
 - Construct and understand frequency tables for a set of data
 - Construct and understand relative frequency tables for a set of data
 - Construct and understand cumulative relative frequency tables for a set of data
- Histograms
 - Create and interpret histograms*

2.2 Histograms and Frequency Tables with Technology

- Histograms and Frequency Tables with Technology - Calculator
 - Construct and understand frequency tables for a set of data with technology - Calculator
 - Construct and understand relative frequency tables for a set of data with technology - Calculator
 - Create and interpret histograms with technology - Calculator
- Histograms and Frequency Tables with Technology - Excel
 - Construct and understand frequency tables for a set of data with technology - Excel
 - Construct and understand relative frequency tables for a set of data with technology - Excel
 - Create and interpret histograms with technology - Excel

2.3 Stem-and-leaf plots, Dot plots, and Line and Bar Graphs

- Creating and Interpreting Stem-and-leaf plots and Dot plots
 - Create and interpret stem-and-leaf plots
 - Create and interpret dot plots
-

- Line and Bar Graphs
 - Create and interpret bar graphs
 - Create and interpret line graphs of data

2.4 Dot plots, Line and Bar graphs with Technology

- Dot plots, Line and Bar graphs with Technology - Calculator
 - Create and interpret dot plots with technology - Calculator
 - Create and interpret line and bar graphs of data with technology - Calculator
- Dot plots, Line and Bar graphs with Technology - Excel
 - Create and interpret dot plots with technology - Excel
 - Create and interpret line and bar graphs of data with technology - Excel

2.5 Choose appropriate graphs to display data

- Choose appropriate graphs to display data

2.6 Measures of Central Tendency

- Using Measures of Central Tendency
 - Find the mean of a set of data*
 - Find the mean from a frequency table*
 - Find the median of a set of data*
 - Find the mode of a set of data*
 - Determine whether the mean, median, or mode is the best measure of center for a data set
- Quartiles and Box Plots
 - Find and interpret percentiles and quartiles of a data set*
 - Find the five-number summary of a data set
 - Identify the interquartile range and potential outliers in a set of data
 - Construct and understand box-and-whisker plots**
- Skewness and Standard Deviation
 - Determine if a data set is skewed
 - Compute the variance and standard deviation*
 - Interpret the standard deviation of a set of data
 - Compute z-scores and use them to compare values from different data sets

2.7 Measures of Center and Spread with Technology

- Calculate measures of center and spread using Technology - Calculator
 - Calculate mean, median and mode for a dataset using Technology - Calculator
 - Create and interpret box and whisker plot using Technology - Calculator
- Calculate measures of center and spread using Technology - Excel
 - Calculate mean, median and mode for a dataset using Technology - Excel
 - Create and interpret box and whisker plot using Technology - Excel

2.8 Calculate Variance and Standard Deviation with Technology

- Variance, Standard Deviation and Z-scores with technology - Calculator
 - Compute the sample variance and sample standard deviation with technology - Calculator
 - Compute z-scores and use them to compare values from different data sets with technology - Calculator
-

- Variance, Standard Deviation and Z-scores with technology - Excel
 - Compute the sample variance and sample standard deviation with technology - Excel
 - Compute z-scores and use them to compare values from different data sets with technology - Calculator-Excel

Chapter 3: Probability Topics

3.1 Probability Terminology, Notation and Basic Computations

- Probability Terminology and Notation
 - Understand definitions of events, outcomes, trials, independent/dependent events, and mutually exclusive events
 - Use and, or, and not notation to describe events
 - Use conditional probability notation to describe events
- Basic Probability
 - Compute basic probability in a situation where there are equally-likely outcomes
 - Compute probability involving and, or, and not*
 - Compute probability using the complement rule*
- Independent and Mutually Exclusive Events
 - Understand mutually exclusive events
 - Find the conditional probabilities of independent and mutually exclusive events*
 - Distinguish between independent or mutually exclusive events given conditional probability information
- Counting Principles
 - Understand factorial notation
 - Calculate and apply combinations
 - Calculate and apply permutations

3.2 Addition and Multiplication Rules

- Multiplication Rules for Probability and the Fundamental Counting Principle
 - Use the multiplication rule for conditional probabilities*
 - Use the multiplication rule for independent event probabilities*
- Addition Rules for Probabilities
 - Use the addition rule for probabilities*
 - Use the addition rule for mutually exclusive event probabilities*

3.3 Diagrams and Contingency Tables

- Contingency Tables for Probability
 - Interpret and complete a contingency table*
 - Use a contingency table to find conditional probabilities*
- Diagrams for Probability
 - Use a tree diagram to list outcomes and compute probabilities*
 - Use a venn diagram to compute compound and conditional probabilities*

Chapter 4: Discrete Random Variables

4.1 Discrete Probability Density Functions

- Discrete Probability
 - Understand the properties of a discrete probability density function*
 - Find the mean of a discrete random variable from its probability density function*
-

- Find the standard deviation of a discrete random variable from its probability density function*

4.2 Distribution Types

- Binomial Distribution
 - Understand the parameters of the binomial distribution*
 - Use the binomial distribution to compute probability*
- Poisson Distribution
 - Understand the parameters of the poisson distribution*
 - Use the poisson distribution to compute probability*
- Geometric Distribution
 - Understand the geometric distribution and use it to compute probability*
 - Compute the mean of a geometric distribution*

4.3 Distribution Types with Technology

- Distribution with Technology - Calculator
 - Calculate mean and standard deviation for a discrete probability distribution using Technology - Calculator
 - Create and interpret a Binomial Distribution with Technology - Calculator
 - Create and interpret a Poisson Distribution with Technology - Calculator
 - Create and interpret a Geometric Distribution with Technology - Calculator
- Distribution with Technology - Excel
 - Calculate mean and standard deviation for a discrete probability distribution using Technology - Excel
 - Create and interpret a Binomial Distribution with Technology - Excel
 - Create and interpret a Poisson Distribution with Technology - Excel
 - Create and interpret a Geometric Distribution with Technology - Excel

Chapter 5: Continuous Random Variables

5.1 Basic Continuous Density Functions and Exponential Distribution

- Basic Continuous Density Functions
 - Use area under the curve to compute probability for continuous probability density functions*
 - Use the uniform distribution to compute probability*
 - Use the uniform distribution to compute conditional probability*
 - Find the mean and standard deviation of the uniform distribution*
- Exponential Distribution
 - Understand the parameters of the exponential distribution*
 - Use the exponential distribution to compute probability*
 - Use the memoryless property of the exponential distribution to compute conditional probability*

5.2 Continuous Density Functions and Exponential Distribution with Technology

- Continuous Density and Exponential Distribution with Technology - Calculator
 - Calculate and create the continuous density distribution with technology - Calculator
 - Calculate and create the exponential distribution with technology - Calculator
-

- Continuous Density and Exponential Distribution with Technology - Excel
 - Calculate and create the continuous density distribution with technology - Excel
 - Calculate and create the exponential distribution with technology - Excel

Chapter 6: The Normal Distribution

6.1 Parameters of the Normal Distribution and Probability Using the Normal Distribution

- Parameters of the Normal Distribution
 - Understand the notation and interpret the parameters of a normal distribution
 - Standardize a normally distributed random variable
 - Calculate the mean and standard deviation of a normal distribution
- Probability Using the Normal Distribution
 - Use the empirical rule for normal distributions to estimate probability*
 - Use the normal distribution to compute probability
 - Use the normal distribution to approximate the binomial*

6.2 Using the Normal Distribution with Technology

- Using the Normal Distribution with Technology - Calculator
 - Use the normal distribution to compute probability with technology - Calculator
 - Use the normal distribution to compute a value for a random variable given probability - Calculator
 - Use the normal distribution to approximate the binomial with technology - Calculator
- Using the Normal Distribution with Technology - Excel
 - Use the normal distribution to compute probability with technology - Excel
 - Use the normal distribution to compute a value for a random variable given probability - Excel
 - Use the normal distribution to approximate the binomial with technology - Excel

Chapter 7: The Central Limit Theorem

7.1 The Central Limit Theorem

- Use the Central Limit Theorem for Means to find the sample mean and the sample standard deviation
- Use the Central Limit Theorem for Sums to find the sample mean and sample standard deviation*
- Use both forms of the Central Limit Theorem to compute probability*

Chapter 8: Confidence Intervals

8.1 Confidence Intervals for Population Mean

- Standard Error
 - Calculate the EBM given a confidence interval
 - Calculate the Sample Mean given a confidence interval
 - Confidence Interval for Population Mean- Population Standard Deviation Known
 - Finding the z-Score Given the Confidence Level (CL)
 - Finding the Confidence Coefficient and Error Bounds
 - Calculate and interpret the confidence interval for a population mean with a known standard deviation*
 - Find the sample size required to estimate a population mean with a given confidence level*
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- Confidence Interval for Population Mean- Population Standard Deviation UnKnown
 - Determine the degrees of freedom to find and interpret the t-score of a normally distributed random variable
 - Use the Student's t-distribution to calculate the confidence interval for a population mean with an unknown standard deviation*
- Confidence Intervals for Population Proportion
 - Calculate the point estimate for population proportion
 - Calculate the mean and standard deviation of the sampling distribution of sample proportions
 - Find the confidence interval given a population proportion*
 - Calculate the sample size required to estimate a population proportion with a given confidence level*
- Empirical Rule
 - Calculate margin of error and confidence intervals
 - Generate a confidence interval using the empirical rule

8.2 Confidence Intervals - Two Samples

- Confidence Intervals for Two Samples
 - Compute confidence interval for difference in population proportions and interpret the interval in context
 - Compute confidence intervals for the difference in population means

8.3 Calculating Confidence Intervals with Technology

- Calculating Confidence Intervals with Technology - Calculator
 - Calculate a Confidence Interval for the Mean, population standard deviation known - Calculator
 - Calculate a Confidence Interval for the Mean, population standard deviation unknown - Calculator
 - Calculate a Confidence Interval for a Proportion - Calculator
- Calculating Confidence Intervals with Technology - Excel
 - Calculate a Confidence Interval for the Mean, population standard deviation known - Excel
 - Calculate a Confidence Interval for the Mean, population standard deviation unknown - Excel
 - Calculate a Confidence Interval for a Proportion - Excel

Chapter 9: Hypothesis Testing for One Population

9.1 Hypothesis Test for the Mean - Population Standard Deviation Known

- Developing Hypothesis and understanding Possible Conclusions
 - Identify the null and alternative hypotheses for an experiment with one population mean
 - Distinguish between one- and two-tailed hypothesis tests and understand possible conclusions
 - Differentiate between Type I and Type II errors when performing a hypothesis test
 - Compute the value of the test statistic (z-value) for a hypothesis test for one population mean with a known standard deviation*
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- Conduct a Hypothesis Test for Mean - Population Standard Deviation Known - Critical Value/Rejection Region Approach
 - Determine the critical value(s) of a one-mean z-test at a given significance level to define a rejection region*
 - Make a conclusion and interpret the results of a one-mean hypothesis test (population standard deviation known) using the Critical Value/Rejection Region Approach
 - Conduct a Hypothesis Test for Mean - Population Standard Deviation Known: P-Value Approach
 - Find the p-value using a table given test statistic value (z-score) of a one-mean hypothesis test
 - Make a conclusion and interpret the results of a one-mean hypothesis test (population standard deviation known) using the P-Value Approach

9.2 Developing Hypothesis and understanding Possible Conclusions

- Developing Hypothesis and understanding Possible Conclusions
 - Compute the value of the test statistic (t-value) and degrees of freedom for a hypothesis test for one population mean with an unknown population standard deviation*
- Conduct a Hypothesis Test for Mean - Population Standard Deviation Unknown - Critical Value/Rejection Region Approach
 - Conduct and interpret a one-mean hypothesis test using the Critical Approach with an unknown standard deviation*
 - Make a conclusion and interpret the results of a one-mean hypothesis test (population standard deviation unknown) using the Critical Value/Rejection Region Approach
- Conduct a Hypothesis Test for Mean - Population Standard Deviation Unknown: P-Value Approach
 - Determine the p-value for a hypothesis test for the mean (population standard deviation unknown)
 - Make a conclusion and interpret the results of a one-mean hypothesis test (population standard deviation unknown) using the P-Value Approach

9.3 Hypothesis Test for Proportion

- Developing Hypothesis and understanding Possible Conclusions
 - Identify the null and alternative hypotheses for an experiment with one population proportion
 - Compute the value of the test statistic (z-value) for a hypothesis test for proportion
 - Conduct a Hypothesis Test for Proportion - Critical Value/Rejection Region Approach
 - Determine the critical value(s) for a hypothesis test for the proportion in order to define rejection region(s)
 - Make a conclusion and interpret the results of a hypothesis test for a proportion using the Critical Value/Rejection Region Approach
 - Conduct a Hypothesis Test for Proportion - P-Value Approach
 - Determine the p-value for a hypothesis test for proportion
 - Make a conclusion and interpret the results for a hypothesis test for proportion using the P-Value Approach
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9.4 Hypothesis Testing with Technology

- Hypothesis Testing with Technology - Calculator
 - Perform and interpret a hypothesis test for the mean, population standard deviation known using Technology - Calculator
 - Perform and interpret a hypothesis test for the mean, population standard deviation unknown using Technology - Calculator
 - Perform and interpret a hypothesis test for a proportion using Technology - Calculator
- Hypothesis Testing with Technology - Excel
 - Perform and interpret a hypothesis test for the mean, population standard deviation known using Technology - Excel
 - Perform and interpret a hypothesis test for the mean, population standard deviation unknown using Technology - Excel
 - Perform and interpret a hypothesis test for a proportion using Technology - Excel

Chapter 10: Hypothesis Testing with Two Populations

10.1 Two-Mean Hypothesis Tests - Independent Samples - Population Standard Deviations Known

- Two-Mean Hypothesis Test with Population Standard Deviations Known
 - Identify null and alternative hypothesis for testing the difference between two means - independent samples - population standard deviations known
 - Calculate test statistic for testing the difference between two means (z value) - population standard deviations known
- Two-Mean Hypothesis Test - Population Standard Deviations Known - Critical Value/Rejection Region Approach
 - Determine the critical value(s) for a hypothesis test for the difference between two means (population standard deviations known) in order to define rejection region(s).
 - Make a conclusion and interpret the results for testing the difference between two means (population standard deviations known) using the Critical Value/Rejection Region Approach
- Two-Mean Hypothesis Test - Population Standard Deviation Known - P-Value Approach
 - Determine the p-value for a hypothesis test for the difference between two means (population standard deviations known).
 - Make a conclusion and interpret the results for testing the difference between two means (population standard deviation known) using the P-Value Approach

10.2 Two-Mean Hypothesis Tests - Independent Samples - Population Standard Deviations Unknown

- Two-Mean Hypothesis Tests with Population Standard Deviations Unknown
 - Identify and understand the null and alternative hypotheses for an experiment with two population means
 - Calculate the test statistic for a two-mean hypothesis test for population variances assumed equal (pooled estimate of the standard deviation)
 - Calculate the test statistic for a two-mean hypothesis test for population variances assumed unequal (nonpooled estimate of the standard deviation)
 - Determine the degrees of freedom for a two-mean hypothesis test for population variances assumed equal (pooled estimate of the standard deviation)
 - Determine the degrees of freedom for a two-mean hypothesis test for population variances assumed unequal (nonpooled estimate of the standard deviation)
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- Conducting a Two-Mean Hypothesis Tests - Population Standard Deviation Unknown - Critical Value/Rejection Region Approach
 - Determine the critical value(s) for a hypothesis test for the difference between two means (population standard deviations unknown) in order to define rejection region(s).
 - Make a conclusion and interpret the results for testing the difference between two means (population standard deviations unknown) using the Critical Value/Rejection Region Approach
- Conducting a Two-Mean Hypothesis Tests - Population Standard Deviation Unknown - P-Value Approach
 - Determine the p-value for a hypothesis test for the difference between two means (population standard deviations unknown).
 - Make a conclusion and interpret the results for testing the difference between two means (population standard deviation unknown) using the P-Value Approach

10.3 Two Mean Hypothesis Tests (Dependent Samples)

- Two Mean Hypothesis Tests (Dependent Samples)
 - Identify dependent samples versus independent samples
 - Identify the null and alternative hypothesis involving the hypothesized mean of the differences for the paired data
 - Calculate the test statistic and degrees of freedom for a hypothesis test for the differences of paired data (dependent samples)
- Two Mean Hypothesis Tests (Dependent Samples) - Critical Value/Rejection Region Approach
 - Determine the critical value(s) for a hypothesis test for the mean of the differences for the paired data in order to define rejection region(s).
 - Make a conclusion and interpret the results for testing the difference between means for paired data (dependent samples) using the Critical Value/Rejection Region Approach
- Two Mean Hypothesis Tests (Dependent Samples) - P-Value Approach
 - Determine the P-value for a hypothesis test for the mean of the differences for the paired data in order to define rejection region(s).
 - Make a conclusion and interpret the results for testing the difference between means for paired data (dependent samples) using the P-Value Approach

10.4 Two population hypothesis test for proportions (Independent Samples)

- Two population hypothesis test for proportions (Independent Samples)
 - Identify the null and alternative hypotheses for a hypothesis test to test the difference between two population proportions
 - Confirm the conditions are satisfied to use a z-test for the hypothesis test to test the difference between two population proportions
 - Compute the value of the test statistic (z-value) for a hypothesis test to test the difference between two population proportions
 - Two population hypothesis test for proportions (Independent Samples) - Critical Value/Rejection Region Approach
 - Determine the critical value(s) for a hypothesis test to test the difference between two population proportions in order to define rejection region(s).
 - Make a conclusion and interpret the results for a hypothesis test to test the difference between two population proportions using the Critical Value/Rejection Region Approach
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- Two population hypothesis test for proportions (Independent Samples) - P-Value Approach
 - Determine the p-value for a hypothesis test to test the difference between two population proportions
 - Make a conclusion and interpret the results for a hypothesis test to test the difference between two population proportions using the P-Value Approach

10.5 Two-Mean Hypothesis Testing with Technology

- Two-Mean Hypothesis Testing with Technology - Calculator
 - Perform and Interpret a Two-Mean Hypothesis Test (population standard deviations known) with Technology - Calculator
 - Perform and Interpret a Two-Mean Hypothesis Test (population standard deviations unknown) with Technology - Calculator
 - Perform and Interpret a Hypothesis Test for Dependent (paired data) with Technology - Calculator
 - Perform and Interpret a Two-Proportion Hypothesis Test with Technology - Calculator
- Two-Mean Hypothesis Testing with Technology - Excel
 - Perform and Interpret a Two-Mean Hypothesis Test (population standard deviations known) with Technology - Excel
 - Perform and Interpret a Two-Mean Hypothesis Test (population standard deviations unknown) with Technology - Excel
 - Perform and Interpret a Hypothesis Test for Dependent (paired data) with Technology - Excel
 - Perform and Interpret a Two-Proportion Hypothesis Test with Technology - Excel

Chapter 11: Chi-Square Distributions

11.1 Introduction to the Chi-Square Distribution

- Introduction to the Chi-Square Distribution
 - Understand the properties of the chi-square distribution*
 - Distinguish between use cases of the chi-square tests

11.2 Chi-Square Tests

- Chi-Square Goodness-of-Fit Test
 - Compute the value of the test statistic using the expected frequencies for a chi-square goodness-of-fit test*
 - Conduct and interpret a chi-square goodness-of-fit test*
 - Chi-Square Independence Test
 - Compute the value of the test statistic using the expected frequencies for a chi-square independence test
 - Conduct and interpret a test of independence with the chi-square distribution*
 - Chi-Square Homogeneity Test
 - Compute the value of the test statistic using the expected frequencies for a chi-square homogeneity test
 - Conduct and interpret a test for homogeneity with the chi-square distribution*
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Chapter 12: Linear Regression

12.1 Linear Regression Equations

- Linear Regression Equations and Application
 - Understand properties of linear equations
 - Understand the relationship between scatter plots and table and determine patterns
 - Find the linear regression equation given a list of data points*
- Uses of Linear Regression
 - Find and interpret the correlation coefficient
 - Make predictions using a line of best fit
 - Find outliers in a data set*

12.2 Recognizing Multivariate Relationships

- Multivariate Relationships
 - Identify applications where Multiple Regression can be performed
 - Define the format for a multiple regression equation
 - Make predictions using the multiple regression equation

12.3 Linear Regression with Technology

- Performing Linear Regressions with Technology - Calculator
 - Calculate the correlation coefficient using Technology - Calculator
 - Determine the best fit linear regression equation using Technology - Calculator
- Performing Linear Regressions with Technology - Excel
 - Calculate the correlation coefficient using Technology - Excel
 - Determine the best fit linear regression equation using Technology - Excel

Chapter 13: Introduction to ANOVA

13.1 ANOVA Basics - Critical Value Approach

- Determine appropriate situations for a one-way ANOVA test and identify the null and alternative hypotheses
- Determine the degrees of freedom for the numerator and denominator for one-way ANOVA test
- Determine the critical value and rejection region for one-way ANOVA test
- Calculate the test statistic for one-way ANOVA test
- Make a decision for the hypothesis test using critical value/rejection region method and interpret results

13.2 Performing an ANOVA test - Critical Value Method - Calculator

- Make a decision for the hypothesis test using critical value/rejection region method and interpret results - Calculator

13.3 Performing an ANOVA test - Critical Value Method - Excel

- Make a decision for the hypothesis test using critical value/rejection region method and interpret results - Excel

13.4 Performing an ANOVA test Basics - P-Value Approach - Calculator

- Make a decision for the hypothesis test using the p-value method and interpret results - Calculator

13.5 Performing an ANOVA test Basics - P-Value Approach - Excel

- Make a decision for the hypothesis test using the p-value method and interpret results - Excel
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