Chapter 1: Thinking Critically and Problem Solving

1.1 Introduction to Reasoning
- Inductive and Deductive Reasoning
  - Understand and use inductive reasoning
  - Understand and use deductive reasoning
  - Identify the premise and conclusion of an argument
  - Find fallacies in an argument

1.2 Estimation and Rounding
- Estimation
  - Estimate a value by rounding a whole number
  - Estimate a value by rounding a decimal
  - Estimate using a pie chart or bar graph
- Accuracy, Precision, and Significant Figures
  - Distinguish between accuracy and precision in measurements
  - Determine the number of significant figures in measurements
  - Use significant figures when performing calculations

1.3 Problem Solving
- Introduction to Problem Solving
  - Explain Polya's four steps to solving a problem
  - Solve a problem using trial and error
  - Solve a problem using estimating
  - Solve a problem using diagram
- Problem Solving with Patterns
  - Solve a problem using patterns
- Applications with Problem Solving Strategies
  - Identify the piece of information needed to solve a problem and unnecessary information given in a problem
  - Solve an application problem by applying Polya's four step procedure

1.4 Problem Solving with Numbers
- Problem Solving Applications
  - Solve a number problem
  - Solve a number problem involving consecutive integers
  - Use a problem-solving strategy for word problems

Chapter 2: Sets

2.1 Set Concepts
- Set Fundamentals
  - Represent a set using set builder notation
  - Determine if two sets are equivalent
  - Determine if two sets are equal
  - Identify the cardinal number for a set
  - Distinguish between finite and infinite sets
• Represent a set using the roster method

• Subsets
  • Find the number of subsets of a set
  • Determine the number of subsets and proper subsets in a given set
  • Identify subsets and proper subsets using set notation
  • Identify subsets, universal sets, empty sets, and set compliments

2.2 Venn Diagrams
• Venn Diagrams from Sets
  • Illustrate the universal set, a set, and complement of a set using a Venn diagram
  • Illustrate two sets using Venn diagram and set notation

• Venn Diagram and Set Operations
  • Determine the complement of a set using Venn diagrams and proper set notation
  • Determine the intersection of two sets using Venn diagrams and set notation
  • Determine the union of two sets using Venn diagrams and set notation

• Set Operations
  • Determine the cardinal number of a union of two finite sets
  • Use Venn diagrams to find the result of set operations on two sets
  • Perform operations on sets

• Venn Diagrams with Three Sets and Verification of Equality of Sets
  • Represent three sets using Venn diagrams
  • Perform set operations on three sets
  • Show that two combinations of sets are equal using Venn diagrams

• Applying Venn Diagrams to Three Sets
  • Apply De Morgan's law using Venn diagrams
  • Construct a Venn diagram to represent the result of a survey
  • Solve applied survey problems

Chapter 3: Logic
3.1 Logical Statements
• Statement and Logical Connectives
  • Identify and negate simple statements
  • Identify and negate quantified statements
  • Identify logical operators and compound statements

• Converting Logic Statements to English
  • Represent and/or/not statements in symbolic form and English
  • Represent conditional statements in symbolic form and English
  • Write biconditional statements in symbolic form and English

• Evaluation of Logical Statements
  • Construct a truth table for a statement with only conjunctions and determine its truth value
  • Construct a truth table for a statement with only disjunctions and determine its truth value
  • Construct a truth table for a statement with both conjunctions and disjunctions and determine its truth value
• Construct a truth table for a statement with conjunctions, disjunctions, or negation, and determine its truth value

3.2 Applications of Truth Tables
• Truth Tables for Negation, Conjunction, and Disjunction
  • Construct a truth table for a statement with a conjunction and/or a negation and determine its truth value
  • Construct a truth table for a statement with a disjunction and/or a negation and determine its truth value
• Truth Tables for Compound, Conditional and Biconditional Statements
  • Construct a truth table for a compound statement with a conjunction and disjunction and determine its truth value
  • Construct a truth table for a conditional statement and determine its truth value
  • Construct a truth table for a biconditional statement and determine its truth value
  • Identify self-contradictions, tautologies, and implications

3.3 Equivalence Statements
• Logical Equivalence
  • Apply De Morgan's laws to conjunctions and disjunctions
  • Use a truth table to determine logical equivalence
  • Determine logical equivalence of English statements
• Equivalent Statements
  • Determine if two statements are equivalent using De Morgan's laws
  • Determine if two symbolic statements are equivalent using a truth table
  • Determine if two statements given in English are equivalent using a truth table

3.4 Conditional Statements
• Conditional Statements
  • Convert a symbolic statement with disjunctions into an equivalent conditional statement
  • Convert an English statement with disjunctions into an equivalent conditional statement
  • Determine logical equivalence of conditional statements
• Converting Disjunctions and Conditionals
  • Convert a disjunction into an equivalent conditional statement
  • Determine if two conditional statements are equivalent
• Symbolic Arguments
  • Draw a conclusion from a conditional statement
  • Determine if an argument is valid using a truth table
  • Identify and validate the standard forms of arguments

3.5 Euler Diagrams
• Euler Diagrams and Syllogistic Arguments
  • Identify syllogistic arguments
  • Determine if a syllogistic argument is valid with a Euler diagram
  • Represent a syllogistic argument with a Euler diagram

Chapter 4: Number Sense
4.1 Exponents
• Exponential Expressions
• Use the product rule of exponents
• Find the power of a product
• Simplify expressions using the quotient property for exponents and the exponent of zero
• Find the power of a quotient
• Use the negative and zero exponent rule
• Simplify exponential expressions

4.2 Scientific Notation
• Understanding Scientific Notation
  • Convert from decimal notation to scientific notation
  • Convert from scientific notation to decimal notation
• Using Scientific Notation
  • Multiply and divide numbers in scientific notation with positive exponents
  • Multiply and divide numbers in scientific notation using a calculator
  • Multiply and divide using scientific notation, including negative exponents

4.3 Converting with Percents
• 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

4.4 Ratios
• Writing Ratios and Using Ratios in Applications
  • Simplify types of ratios
  • Write a ratio as a fraction
  • Use ratios in applications
  • Understand ratios
• Unit Rates and Unit Prices
  • Calculate per capita
  • Write a rate as a fraction
  • Find unit rates
  • Find unit price
  • Translate phrases to expressions as rates or ratios
• Advanced Ratios
  • Solve fractional ratio problems
  • Understand fractional ratios

4.5 Proportions
• Introduction to Proportions
  • Use the definition of proportion
  • Introduction to solving proportions
• Solve applications using proportions
  • Translate and solve percent proportions
  • Interpret application problems with proportions
  • Solve proportions
• Scaling and Similar Figures
- Solve applications involving scaling
- Solve similar figure applications

- Applications with Proportions
  - Use proportions to scale per capita values
  - Use proportions to make predictions
  - Solve proportions using scientific notation
  - Estimating inflation with proportions
  - Solve proportions involving rates
  - Using proportions to compare
  - Solve applications with proportions

4.6 Dimensional Analysis

- Unit Conversion in the US System
  - Make unit conversions in the US system
  - Use mixed units of measurement in the US system

- Unit Conversion in the Metric System
  - Make unit conversions in the metric system
  - Use mixed units of measurement in the metric system

- Unit Conversion Between Systems
  - Convert between non-metric units and metric units using dimensional analysis
  - Convert between the US and metric systems of measurement
  - Convert between Fahrenheit and Celsius temperatures

- Dimensional Analysis
  - Convert between volumes
  - Convert between areas

- Rate Conversions
  - Convert from a rate to a rate

- Applications in the Health Sciences
  - Calculate the appropriate dose of medication given specific information

Chapter 5: Financial Mathematics

5.1 Uses of Percents

- Calculating Change
  - Calculate a percent increase or a percent decrease
  - Calculate relative change
  - Calculate absolute change

- Calculating Change with Percentages
  - Interpreting change with percentages
  - Calculate relative change with percentages
  - Calculate absolute change with percentages

- Applications of Percents with Discounts and Sales Tax
  - Solve applications with mark-up
  - Solve applications with discounts
  - Determine the final cost of an item including sales tax and discounts
  - Solve applications with sales tax
5.2 Inflation and Taxes

- CPI and Inflation
  - Calculate the annual rate of inflation
  - Use the Consumer Price Index to calculate inflation rates
- Introduction to Taxes
  - Explain and interpret FICA and federal income taxes
  - Explain and interpret tax terminology
- Applications of Percents with Income Taxes
  - Calculate income tax using federal tax tables
  - Calculate income tax
  - Calculate gross income with adjustments
  - Calculate taxable income

5.3 Interest

- Simple Interest
  - Calculate interest discounts on a discounted loan
  - Find future value using simple interest
  - Solve a word problem involving simple interest
  - Calculate simple interest
- Introduction to Compound Interest
  - Calculate the difference between simple and compound interest
  - Calculate periodically compounded interest
  - Calculate annually compounded interest
  - Use the compound interest formula to find the new value of an account
- Continuously Compounding Interest
  - Use the continuously compounding interest formula to find the new value of an account
  - Calculate continuously compounded interest

5.4 Investments

- Applications with Annuities
  - Calculate the payment needed to achieve a determined future value
  - Calculate effective annual yield
  - Calculate the value of an annuity using Excel
  - Calculate the value of an annuity
  - Understanding and interpreting annuities
- Stocks and Bonds
  - Understanding bond characteristics
  - Define bond terminology
  - Determine relative value
  - Define stock terminology
  - Read a stock table

5.5 Budgeting

- Making a Personal Budget
  - Apply general guidelines for budget
  - Create a personal budget with categories expenses and income

5.6 Loans
• Credit Cards and Interest
  • Complete a credit card table using given information
  • Calculate the monthly finance charge
  • Recognize key features of credit cards
  • Calculate the average daily balance of a credit card
  • Determine interest to be paid on a card's next billing date
  • Explain and interpret credit scores

• Mortgages and Amortizations
  • Construct a loan amortization schedule
  • Calculate the monthly payment and interest cost for a mortgage
  • Understanding and interpreting mortgages

• Mortgages and Amortizations with Excel
  • Construct a loan amortization schedule using Excel
  • Calculate the interest cost for a mortgage using Excel
  • Calculate the monthly payment for a mortgage using Excel

• Other Loans
  • Calculate the present value of a loan
  • Choose the best installment loan plan
  • Understanding and interpreting loans

• Student Loans
  • Summarize possible course of actions if I defaulted on my student loans
  • Summarize common repayment obligations
  • Distinguish between federal and private student loans and state distinctions
  • Explain and interpret student loans
  • Evaluate student loan options

• Car Loans
  • Solve application problems involving owning and maintaining a car
  • Identify and contrast the pros and cons of purchasing versus leasing a car
  • Calculate the monthly payment for a vehicle
  • Explain and interpret car loans

Chapter 6: Graphs
6.1 Frequency Tables and Histograms
  • Frequency Tables
    • Constructing and understanding frequency tables for a set of data, given class limits
    • Construct and understand relative frequency tables for a set of data
    • Construct and understand cumulative relative frequency tables for a set of data
  • Frequency Tables and Histograms
    • Construct and understand frequency tables for a set of data
    • Interpret histograms
    • Create histograms
    • Identify and label shapes of histograms

6.2 Frequency Tables and Histograms for Grouped Data
  • Histograms and Frequency Tables for Grouped Data
6.3 Frequency Tables and Histograms with Technology
  • 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
  • Histograms and Frequency Tables with Grouped Data – Technology - Excel
    • Create and analyze histograms and frequency tables with grouped data – Excel

6.4 Graphical Representations of Data
  • Line and Bar Graphs
    • Create and interpret bar graphs
    • Create and interpret line graphs of data
  • Interpreting Graphs
    • Analyze graphical misrepresentations of data
  • Dot Plots and Stem and Leaf Plots
    • Create and interpret dot plots
    • Create and interpret stem-and-leaf plots

6.5 Graphical Representations of Data with Technology
  • Line and Bar Graphs with Technology - Excel
    • Create and interpret line and bar graphs of data with technology - Excel

6.6 Understanding Appropriate Graphical Representations
  • Choose Appropriate Graphs to Display Data
    • Choose appropriate graphs and charts to display data

Chapter 7: Statistics
7.1 Introduction to Experimental Design
  • Overview of Statistics and Experimental Design
    • Evaluate the strength of evidence against a claim about a population proportion
    • Identify and describe the steps in the statistical analysis process
  • Components of Experimental Design
    • Identify components of the experimental design in a given experiment: use of a control group, use of a placebo, and blinding
    • Determine whether a study is observational or an experiment and appropriate use cases
    • Identify confounding variables
  • Variables and Measures of Data
    • Identify explanatory and response variables in an experiment
    • Define and distinguish between qualitative, quantitative, discrete, and continuous variables
    • Identify levels of measurement of data

7.2 Sampling
  • Sampling Methods
    • Draw an inference based on information given
- Understand the definitions of population, sample, statistic, parameter, and data
- **Comparing Sampling Methods**
  - Identify and distinguish between stratified, cluster, systematic, and convenience sampling
  - Determine appropriate sampling methods
- **Sampling Errors, Bias and Misleading Statistics**
  - Explain why a poor sampling plan can result in misleading conclusions
  - Identify situations in which statistics can be misleading

**7.3 Measures of Central Tendency**
- **Measures of Central Tendency**
  - Find the mean of grouped data
  - Calculate the range of a data set
  - Find the midrange of a set of data
  - 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
- **Impact of Outliers on Measures of Central Tendency**
  - Identify the effect on measures of central tendency when adding, subtracting, multiplying, or dividing the entire data set by a constant
  - Identify the effect of outliers on measures of central tendency
  - Determine whether the mean, median, or mode is the best measure of center for a data set
- **Distribution Shape**
  - Define and interpret number of modes in a data set
  - Determine if a data set is skewed
- **Weighted Averages**
  - Calculate a weighted average from a bar graph or histogram
  - Calculate weighted averages using percents
  - Calculate weighted averages using counts

**7.4 Quartiles and Box Plots**
- **Quartiles and Box Plots**
  - Construct and understand box-and-whisker plots
  - Identify the interquartile range and potential outliers in a set of data
  - Find the five-number summary of a data set
  - Find and interpret quartiles of a data set
  - Find and interpret percentiles of a data set

**7.5 Introduction and Application of Standard Deviation**
- **Skewness and Standard Deviation**
  - Interpret the standard deviation of a set of data
  - Understand the standard deviation of a set of data
  - Compute standard deviation
  - Compute variance
- **Z-scores**
  - Compare values from different data sets using z-scores
• Interpret z-scores
• Compute z-scores

• Introduction to the Empirical Rule and Chebyshev's Theorem
  • Understand principles of the Empirical Rule
  • Understand principles of Chebyshev's Theorem

7.6 Measures of Center and Spread with Technology
• Calculate Measures of Center and Spread Using Technology – Excel
  • Create and interpret box and whisker plot using Technology - Excel
  • Calculate mean, median and mode for a dataset using Technology – Excel
  • Calculate percentiles for a dataset using technology - Excel

7.7 Introduction and Application of Standard Deviation with Technology
• Variance, Standard Deviation and Z-scores with Technology - Excel
  • Compute the variance and standard deviation with technology - Excel
  • Compute z-scores and use them to compare values from different data sets with technology – Excel

7.8 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 standard deviation of a normal distribution
  • Calculate the mean 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 the probability "between"
  • Use the normal distribution to compute the probability "more"
  • Use the normal distribution to compute the probability "less"
  • Use Normal Distribution to find values or z-scores given a probability

7.9 Normal Distribution with Technology
• 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 8: Probability
8.1 Introduction to Probability
• Introduction to Probability
  • Use tree diagrams to list outcomes and compute probabilities
  • Using and, or, and not notation to describe events
  • Define and explain probability terminology, likelihood and experiments
• Basic Probability Rules
  • Describe more than one event
  • Compute probability with equally likely outcomes
• Types of Probability
• Make and test predictions using empirical probability models
• Complement and Addition Rules for Probability - Algebraic Approach
  • Using the complement rule for probabilities
  • Using the addition rule for probabilities

8.2 Probability Rules
• Mutually Exclusive Events - Algebraic Approach
  • Use the multiplication rule for independent event probabilities
  • Using the addition rule for mutually exclusive event probabilities
  • Explain mutually exclusive events
• Conditional Probabilities - Algebraic Approach
  • Create tables to interpret false positives or false negatives
  • Create and interpret contingency tables to find probability
  • Using conditional probability notation to describe events
• Multiplication Rule and Independent and Mutually Exclusive Events - Algebraic Approach
  • Distinguishing between independent or mutually exclusive events given conditional probability information
  • Using the multiplication rule for conditional probabilities
• Probability Fundamentals - Conceptual Approach
  • Compute probabilities containing "not"
  • Compute simple probabilities using totals
• Applications of Probability - Conceptual Approach
  • Compute "or" probabilities with overlapping conditions
  • Compute mutually exclusive probabilities containing "or"
  • Compute probabilities containing "and"
• Conditional Probabilities - Conceptual Approach
  • Create contingency tables to interpret false positives or false negatives
  • Create and interpret a contingency table to find probability
  • Compute conditional probabilities

8.3 Counting Principles
• Counting Principles
  • Counting with combinations
  • Counting with permutations
  • Understand and explain the fundamental counting principle
  • Compute expressions containing factorials
• Counting to Find Probability
  • Determine which probability method for a given context
  • Compute probability involving permutations and combinations

8.4 Odds and expected value
• Odds
  • Distinguish between risk and odds
  • Compute odds using probability
• Expected Value
  • Applications using expected value
  • Compute the expected value of an event
Chapter 9: Linear Modeling

9.1 Introduction to Graphing Linear Equations
- Graphing by Plotting Points
  - Graph equations by plotting points
  - Graph linear equations by plotting points
  - Plot ordered pairs in a Cartesian coordinate system
- Using Slope
  - Find the slope given a line or given two points
  - Calculate a slope in word problems
  - Interpret slope as a rate of change

9.2 Graphing Linear Equations
- Graphing Linear Equations
  - Understand the relationship between the slope and y-intercept of a line and its equation
  - Graph a line using a point and a slope

9.3 Working with Linear Equations
- Finding Equations
  - Determine a linear function using point-slope form
  - Find equation of a line, in slope-intercept form, given slope and one point (point-slope formula)
  - Find equation, in slope-intercept form, of a line passing through two given points

9.4 Introduction to Functions
- Identifying Functions
  - Determine whether a relation represents a function
  - Use the vertical line test to identify functions
- Find the Domain and Range of a Function
  - Identify domain and range from a set of ordered pairs
  - Find the domain and range of a function defined by a graph

9.5 Evaluate Functions
- Function Notation
  - Understand function notation
  - Evaluate a function using function notation
- Evaluating Functions
  - Evaluate or solve a function from a table
  - Evaluate or solve a function from a graph
  - Represent a linear function in table form

9.6 Linear Equation Applications
- Linear Equation Applications
  - Use a formula to solve a real-world application
  - Translate verbal expressions into mathematical expressions
  - Set up a linear equation to solve a real-world application
  - Represent a real-world application as a linear function
- Linear Models in Context
  - Use a linear model to predict values using applications
  - Write a linear model from applications
• Identify y-intercept in applications
• Identify slope in applications

9.7 Linear Regression
• Linear Regression Equations and Application
  • Understand properties of linear equations
  • Understand the relationship between scatter plots and tables and determine patterns
• Uses of Linear Regression
  • Identifying the line of best fit (Least Squares Regression)
  • Make predictions using a line of best fit
  • Find and interpret interpolation vs extrapolation
  • Find and interpret the correlation coefficient
• Correlation and Causation
  • Interpret the slope and y-intercept of the least squares regression line
  • Understand the difference between correlation and causation
  • Distinguish between positive, negative and no correlation

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

Chapter 10: Exponential Modeling
10.1 Linear Functions vs Exponential Functions
• Differentiate between Linear and Exponential Functions
  • Identify types of functions from a table
  • Identify types of functions from a word problem
  • Identify types of functions from a graph
  • Identify types of functions derived from repetitive adding versus repetitive multiplying

10.2 Introduction to Exponential Functions
• Introduction to Exponential Functions
  • Evaluate exponential functions
  • Identify exponential functions

10.3 Applications of Exponential Models
• Exponential Models in Context
  • Use an exponential model to predict values in applications
  • Write an exponential model using a growth or decay factor
  • Determine the decay factor
  • Determine the growth factor

Chapter 11: Geometry
11.1 Introduction to Geometric Properties
• Points, Lines, and Planes
  • Construct a line, line segment, and ray given two points
  • Find the intersection or union of two line segments, a ray and a line segment, or two rays
11.2 Triangles
- Identify planes
- Angles
  - Identify right, acute, obtuse, and straight angles
- Properties of Triangles
  - Use properties of similar triangles to solve for a missing side
  - Use properties of triangles and right angles
  - Identify triangles given their properties
- The Pythagorean Theorem
  - Use the Pythagorean theorem
  - Solve triangle problems using the Pythagorean Theorem
- Area and Perimeter of Triangles
  - Find the perimeter of a triangle
  - Find the area of a triangle

11.3 Quadrilaterals
- Rectangles
  - Find the perimeter of rectangles
  - Find the area of a rectangle
  - Properties of rectangles
- Parallelograms
  - Find the perimeter of a parallelogram
  - Find the area of a parallelogram
  - Properties of parallelograms
- Trapezoids
  - Find the perimeter of a trapezoid
  - Find the area of a trapezoid
  - Properties of trapezoids

11.4 Polygons
- Polygons
  - Use properties of similar polygons to solve for a missing side
  - Determine the measure of an angle using properties of polygons
  - Identify polygons given their properties
- Area and Perimeter
  - Find the perimeter of regular polygons
  - Find the area of regular polygons

11.5 Circles
- Circles
  - Find the area of a circle
  - Find the circumference of a circle

11.6 Prisms
- Introduction to Prisms
  - Properties of prisms
  - Identify types of prisms
- Rectangular Base
- Find the surface area of a rectangular prism
- Find the volume of a rectangular prism

11.7 Pyramids
- Introduction to Pyramids
  - Properties of pyramids
  - Identify types of pyramids
- Rectangular Base
  - Find the surface area of a rectangular pyramid
  - Find the volume of a rectangular pyramid
- Triangular Base
  - Find the surface area of a triangular pyramid
  - Find the volume of a triangular pyramid

11.8 Cylinders
- Cylinders
  - Find the surface area of a cylinder
  - Find the volume of a cylinder
  - Properties of cylinders

11.9 Cones
- Cones
  - Find the surface area of a cone
  - Find the volume of a cone
  - Properties of cones

11.10 Spheres
- Spheres
  - Find the surface area of a sphere
  - Find the volume of a sphere
  - Properties of spheres

11.11 Art
- Patterns
  - Properties of perspective
  - Properties of fractals
  - Properties of tessellations

Chapter 12: Voting and Fair Division
12.1 Fair Division
- Introduction to Fair Division
  - Determine whether the fair division is over a continuously divisible item or a discretely divisible item
  - Identify the differences between fair division, envy-free division, a Pareto optimal division, and equitable division
  - Define and determine the elements of fair division
- Using Fair Division
  - Find the fair division by using the sealed bids method
  - Find the fair division by using the last diminisher method or the moving knife method
• Find the fair division by using the divider-chooser method or the lone divider method

12.2 Voting Methods - Identifying a Winner
• Voting Methods - Winning by Plurality
  • Determine the winner of an election using the Borda count method
  • Choose the winner of an election using the plurality method
  • Identify elements of a preference table
• Comparison Voting Methods
  • Select the winner of an election using the pairwise comparison method
  • Decide the winner of an election using the plurality with elimination method

12.3 Determine a Voting Systems Fairness
• Criterion of Voting Methods - Majority, Head-to-Head Count, and Monotonicity
  • Determine a voting systems fairness using the head-to-head count criterion
  • Determine a voting system's fairness using the majority criterion
  • Determine a voting system's fairness using the monotonicity criterion
• Criterion and Comparison of Voting Methods
  • Choose the best voting system for a given election
  • Determine a voting system's fairness using the irrelevant alternatives criterion

12.4 Apportionment Methods
• Apportionment Methods by Calculating Quotas
  • Calculate the lower and upper quotas for a state given its population
  • Determine the standard quota for a state given its population
• Apportionment Methods - Hamilton, Jefferson, Adam and Webster Methods
  • Use Adams' method of determining apportionment
  • Use Jefferson's method of determining apportionment
  • Use Hamilton's method of determining apportionment
  • Use Webster's method of determining apportionment
• Flaws of the Apportionment Methods
  • Choose the best apportionment system for a given region
  • Identify where the new states paradox occurs
  • Identify where the population paradox occurs
  • Identify where the Alabama paradox occurs

Chapter 13: Graph Theory
13.1 Introduction to Graph Theory
• Modeling Relationships with Graphs
  • Recognize equivalent graphs
  • Construct a simple graph to model relationships using information given
• Basics of Graph Theory
  • Recognize circuits
  • Determine the degree of a vertex
  • Identify adjacent vertices
  • Distinguish between connected and disconnected graphs

13.2 Trees
• Trees
• Develop a spanning tree for a given graph
• Identify a tree

13.3 Types of Circuits
• Euler Paths and Euler Circuits
  • Identify Euler paths and circuits
  • Determine if a graph has a circuit using Euler’s theorem
  • Solve application problems using Euler’s theorem
• Hamilton Paths and Hamilton Circuits
  • Identify a Hamilton path and a Hamilton circuit for a given graph
  • Determine the number of Hamilton circuits in a graph

13.4 Weighted Graphs
• Weighted Graphs
  • Identify the optimal Hamilton circuit using the brute force method
  • Identify the optimal Hamilton circuit using the nearest neighbor method

Corequisite Support: A Targeted Review

Chapter 1: Introduction to Real Numbers
• Real Numbers
  • Introduction to Whole Numbers
    • Round whole numbers
    • Identify the place value of a digit and write a whole number using words or digits
  • Operations with Whole Numbers
    • Add whole numbers
    • Subtract whole numbers
    • Multiply whole numbers
    • Divide whole numbers using long division
  • Find Factors and Identify Prime and Composite Numbers
    • Find the prime factorization of a number
    • Express a number as a product of primes
  • Identify Multiples and Use Divisibility Tests
    • Identify multiples and apply divisibility tests
    • Find the least common multiple of two numbers
  • Understand and Use Properties of Real Numbers
    • Understand the multiplication and division properties of zero
    • Use the commutative and associative properties
    • Identify additive and multiplicative inverses of a number
• Classifying Real Numbers
  • Identify real numbers
  • Identify rational and irrational numbers
• Introduction to Fractions
  • Locate fractions on a number line and write inequality statements involving fractions
• Find equivalent fractions
• Find reciprocals of fractions
• Understand fractions and their models
• Simplify a fraction
• Identify when fractions are equivalent

• Operations with Fractions
  • Add and subtract fractions with unlike denominators
  • Add and subtract fractions with like denominators
  • Multiply fractions
  • Divide fractions

• Complex Fractions
  • Use the order of operations to simplify complex fractions and expressions with multiple operations
  • Simplify complex fractions

• Convert between Decimals, Fractions, and Percents
  • Convert between percents, decimals, and fractions
  • Convert between fractions and decimals
  • Convert between decimals and percents

• Introduction to Decimals
  • Name and write decimals
  • Round decimals

• Operations with Decimals
  • Add and subtract decimals
  • Multiply decimals
  • Divide decimals

• Introduction to Integers
  • Understand integers and find opposites of numbers
  • Understand and evaluate absolute value
  • Order and compare integers
  • Order integers using inequality symbols and determine the opposite of integers or variables
  • Understand distance in terms of absolute value

• Operations with Integers
  • Add integers
  • Subtract integers
  • Add and subtract integers using order of operations
  • Multiply integers
  • Divide integers

Chapter 2: Expressions
• Simplify Expressions
  • Simplifying Expressions using Properties and the Order of Operations
    • Simplify expressions using the distributive property
    • Simplify expressions using properties of identities, inverses, and zero
    • Simplify expressions by distributing a negative number
• Simplify an expression involving absolute value using order of operations
• Simplify Expressions with the Order of Operations
  • Simplify expressions written with a fraction bar
  • Simplify an expression using order of operations
  • Simplify expressions with integers using order of operations
  • Simplify expressions with fractions and decimals
• Evaluate Expressions
  • Evaluate Exponential Expressions
    • Evaluate a whole number raised to a power and understand the terminology
  • Evaluate Expressions
    • Evaluate variable expressions with fractions
    • Evaluate an expression with factorials
    • Evaluate an expression
  • Translate English Phrases to an Algebraic Expression
    • Translate English phrases from applications into algebraic expressions
    • Translate an English phrase to an algebraic expression
• Polynomials
  • Introduction to Polynomials
    • Identify coefficients and identify and combine like terms
  • Operations with Polynomials
    • Add and subtract monomials
    • Add and subtract polynomials
• Radicals
  • Square Root Expressions
    • Evaluate a square root
    • Simplify expressions with square roots

Chapter 3: Equations and Inequalities
• Translate English Statements into Mathematical Statements
  • Translate English statements into Expressions or Equations
    • Translate an English sentence to an algebraic equation and solve using the division and multiplication properties of equality
    • Translate an English sentence to an algebraic equation and solve using the subtraction and addition properties of equality
    • Translate algebraic expressions, equations, and inequalities into English and recognize expressions and equations
• Solve Linear Equations
  • Solve Equations using the Addition and Subtract Properties of Equality
    • Verify a solution of an equation
    • Use the subtraction and addition properties of equality to solve application problems
    • Solve an equation using the subtraction and addition properties of equality
    • Solve an equation that requires simplification using the subtraction and addition properties of equality
- Solve an equation involving fractions or decimals using the subtraction and addition properties of equality
- Solve Equations using the Multiplication and Division Properties of Equality
  - Use the division and multiplication properties of equality to solve application problems
  - Solve an equation using the division and multiplication properties of equality
  - Solve an equation that requires simplification using the division and multiplication properties of equality
  - Solve an equation involving fractions or decimals using the division and multiplication properties of equality
- Solving Equations with the Distributive Property
  - Solve an equation using the distributive property with variables on one side
  - Solve an equation using the distributive property with variables on both sides
- A General Strategy for Solving Equations
  - Solve equations using cross multiplication
  - Classify equations as conditional, identity, or a contradiction
  - Solve an equation with variables on both sides
  - Solve an equation with constants on both sides
  - Solve an equation with constants and variables on both sides
- Use a General Strategy for Solving Equations with Fractions and Decimals
  - Solve an equation involving fractions by eliminating the fractions and other steps
  - Solve an equation involving decimals by clearing the decimals
  - Solve an equation involving decimals with variables on both sides
  - Solve an equation involving fractions with variables on both sides
  - Solve an equation involving fractions by eliminating the fractions
- Use Formulas while Solving Equations
  - Use Formulas while Solving Equations
    - Solve a formula for a given variable
    - Use a formula
    - Use the distance, rate, and time formula
- Solve Applications
  - Solve coin word problems
- Solve Applications of Percent
  - Percent Applications with Equations
    - Translate and solve basic percent equations
    - Solve basic applications of percent
- Linear Inequalities
  - Graph Inequalities and Interval Notation
    - Use properties of inequalities
    - Graph an inequality on the number line
    - Express an inequality using interval notation
  - Solve Linear Inequalities
    - Solve simple inequalities in one variable algebraically
    - Translate an English sentence into an inequality and solve
• Solve one-step applications with linear inequalities

Chapter 4: Lines
• Intercepts and Slope
  • Intercepts on the Coordinate Plane
    • Identify the x- and y-intercepts on a graph
    • Find the x- and y-intercepts from an equation of a line
  • Understanding Slope
    • Identify the slope and y-intercept from an equation of a line and relate a graph to the equation
    • Use the relationship between rise and run to find the slope of a line from its graph
    • Find the slope of horizontal and vertical lines
    • Determine the slope in applications
• Graphing Linear Equations
  • Graph Linear Equations
    • Recognize the relationship between the solutions of an equation and its graph
    • Graph a line given its equation using its slope and y-intercept
    • Graph and interpret applications of slope-intercept
    • Graph a line using the x- and y-intercepts

Appendix | Quantitative Reasoning with Corequisite Support: A Targeted Review

• Number Sense
  • Introduction to Number Sense
  • Integers
  • Fractions
  • Algebraic Expressions
• Linear Equations and Inequalities
  • Linear Equations
  • Linear Inequalities
• Math Models
  • Problem Solving
  • Geometry
• Graphs
  • Graphing Linear Equations
  • Equations of Lines
  • Graphing Linear Inequalities
• Systems of Linear Equations
  • Solving Systems of Linear Equations
  • Problem Solving
• Exponential and Logarithmic Functions and Their Graphs
  • Exponential Functions
  • Logarithmic Expressions
• Logarithmic Functions
  • Solve Exponential and Logarithmic Equations
  • Exponential and Logarithmic Models
• Polynomials, Exponents, and Scientific Notation
  • Polynomials
  • Exponents
  • Scientific Notation
• Roots and Radicals
  • Square Roots
  • Rational Exponents
• Factoring and Quadratic Equations
  • Factor Polynomials
  • Solve Quadratic Equations
• Sets
  • Sets
• Sequences and Series
  • Sequences
  • Series
• Data Presentation and Interpretation
  • Foundations of Statistics
  • Tables, Charts, and Graphs
  • Probability, Normal Distributions, Percentiles, Variance, and Standard Deviation
• Circuits and Diagrams
  • Circuits and Diagrams
• Mathematical Systems
  • Mathematical Systems
  • Clock and Modular Arithmetic