In this course, students will study the broad characteristics of functions and their behaviors and solve problems that require the formulation of linear, quadratic, polynomial, exponential, logarithmic equations or a system of equations or inequalities. Probability, experimental design and implementation, and analysis of data will be incorporated into the study of functions, and data will be generated by practical applications derived from real life scenarios.

This course is built to Virginia’s standards for Algebra, Functions and Data Analysis.

Length: Two semesters

UNIT 1: FUNCTIONS AND RELATIONS

LESSON 1: WHAT IS A FUNCTION?

Study: Relating to Functions
Learn about functions, their graphs, and some special functions.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on functions.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: What Is a Function?
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: GRAPhING FUNCTIONs

Study: Graphing Functions
Learn the vertical line and horizontal line tests for evaluating a function. Evaluate a function for given values and explore special functions.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on graphing functions.
Duration: 0 hrs 25 mins

Quiz: Graphing Functions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 3: LINEAR FUNCTIONs

Study: Linear Functions
Learn about slope and the three main forms of linear functions.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on linear functions.
Duration: 0 hrs 25 mins

Quiz: Linear Functions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 4: LINEAR EQUATIONS AND INEQUALITIES
Study: Linear Equations and Inequalities
Learn how to solve linear equations and inequalities.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on linear equations and inequalities.
Duration: 0 hrs 25 mins

Quiz: Linear Equations and Inequalities
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: The Summer Job
Work through a real-world problem involving linear equations and inequalities.
Duration: 0 hrs 30 mins Scoring: 20 points

LESSON 5: LINEAR SYSTEMS

Study: Linear Systems
Find the point of intersection of linear systems using algebra, graphing, and matrices.
Duration: 0 hrs 35 mins

Study: Connection to Business: Linear Programming
Learn how businesses solve problems using linear programming.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on linear systems.
Duration: 0 hrs 25 mins

Quiz: Linear Systems
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Modeling: Best Ticket Deal
Model ticket pricing using an equation.
Duration: 0 hrs 30 mins Scoring: 20 points

LESSON 6: FUNCTIONS AND RELATIONS WRAP-UP

Checkup: Practice Problems
Check your understanding of the unit.
Duration: 0 hrs 25 mins Scoring: 0 points

Review: Functions and Relations
Get ready for the unit test by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Test (CS): Functions and Relations
Take a computer-scored test to check what you have learned in this unit.
Duration: 0 hrs 40 mins Scoring: 50 points

Test (TS): Functions and Relations
Take a teacher-scored test to check what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 2: QUADRATIC FUNCTIONS

LESSON 1: FACTORING $x^2 + bx + c$

Study: Factoring $x^2 + bx + c$
Learn about factoring quadratic trinomials with leading coefficients of 1; rules for finding the constant term and
coefficient of the $x$-term; using a table to factor trinomials; and diagramming signs while factoring trinomials.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Binomial Factors of Trinomials**
Take a quiz to check your understanding of what you have learned.

**Quiz: Factoring Trinomials**
Take a quiz to check your understanding of what you have learned.

**LESSON 2: FACTORING $AX^2 + BX + C$**

**Study: Factoring $ax^2 + bx + c$**
Learn about factoring trinomials with leading coefficients other than 1; factoring out a leading coefficient of -1; how values of factors relate to values of a trinomial; finding factor pairs of leading coefficients and constant terms; and finding signs in factors of trinomials with leading coefficients other than 1.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Factoring Trinomials (Basic)**
Take a quiz to check your understanding of what you have learned.

**Quiz: Factoring Trinomials (Advanced)**
Take a quiz to check your understanding of what you have learned.

**LESSON 3: SPECIAL CASES**

**Study: Special Cases**
Identify and factor differences of squares and perfect-square trinomials.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Factoring a Difference of Squares**
Take a quiz to check your understanding of what you have learned.

**Quiz: Factoring Perfect Square Trinomials**
Take a quiz to check your understanding of what you have learned.

**Quiz: Sum or Difference of Two Cubes**
Take a quiz to assess your understanding of the material.

**Journal: Breakdown Ahead**
Explain your understanding of factoring to help a peer solve a problem.
LESSON 4: SOLVING QUADRATIC EQUATIONS

Study: Solving Quadratic Equations
Learn about solving quadratic equations using factoring and the zero product rule, manipulating a quadratic equation into standard form, and solving quadratic equations with perfect-square trinomials.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Factoring with the Zero Product Rule
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Converting Quadratics to Standard Form
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Quadratics with Perfect Square Trinomials
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 5: COMPLETING THE SQUARE

Study: Completing the Square
Learn the “completing the square” method of solving quadratic equations. Practice adding a strategic number to both sides of an equation to make one side a perfect-square trinomial. Then solve the equation by taking the square root of both sides and simplifying. Use algebra tiles to determine the number needed to complete the square.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Completing the Square
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Completing the Square (Advanced)
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 6: THE QUADRATIC FORMULA

Study: The Quadratic Formula
Learn about types of equations that can be solved with the quadratic formula; complex numbers; discriminants; and finding roots (including complex roots) using the quadratic formula.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Complex Numbers and Discriminants
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: The Quadratic Formula
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points
LESSON 7: GRAPHS OF QUADRATIC FUNCTIONS

Study: Graphs of Quadratic Functions
Relate factors of a quadratic function to the graph of a parabola and its corresponding x-intercepts. Locate the vertex of a quadratic function graphically and algebraically. Use the discriminant of the quadratic formula to identify the number and types of solutions to a given quadratic equation, as well as to visualize its corresponding graph.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Graphs of Quadratic Functions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Working with the Discriminant
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Modeling: Pumpkin Launch
Model a graph with real world data.
Duration: 0 hrs 30 mins Scoring: 20 points

LESSON 8: IMAGINARY NUMBERS

Study: Imaginary Numbers
Learn about imaginary and complex numbers, perform basic arithmetic operations on complex numbers, and solve equations with imaginary and complex numbers.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Imaginary Numbers
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Operations on Complex Numbers
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Quadratics With Complex Solutions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 9: NONLINEAR SYSTEMS OF EQUATIONS

Study: Nonlinear Systems of Equations
Learn about solution sets for nonlinear systems of equations, solving nonlinear systems of equations using the substitution method, choosing which variable to isolate, substituting a squared variable, and determining the number of solutions. Explore a human-cannonball case study.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Nonlinear Systems of Equations
Take a quiz to check your understanding of what you have learned.
**LESSON 10: NONLINEAR SYSTEMS OF INEQUALITIES**

**Study: Nonlinear Systems of Inequalities**
Learn about solution sets for and graphs of nonlinear inequalities; boundaries of parabolas; three steps to graphing nonlinear inequalities; and nonlinear systems of inequalities.

**Duration:** 0 hrs 35 mins  
**Scoring:** 0 points

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Duration:** 0 hrs 25 mins  
**Scoring:** 0 points

**Quiz: Nonlinear Inequalities**
Take a quiz to check your understanding of what you have learned.

**Duration:** 0 hrs 20 mins  
**Scoring:** 20 points

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**LESSON 11: QUADRATIC FUNCTIONS WRAP-UP**

**Checkup: Practice Problems**
Submit your work for a set of 20 practice problems.

**Duration:** 0 hrs 25 mins  
**Scoring:** 0 points

**Review: Quadratic Functions**
Get ready for the unit test by reviewing important ideas and skills.

**Duration:** 0 hrs 20 mins  
**Scoring:** 0 points

**Test (CS): Quadratic Functions**
Take a computer-scored test to check what you have learned in this unit.

**Duration:** 0 hrs 40 mins  
**Scoring:** 50 points

**Test (TS): Quadratic Functions**
Take a teacher-scored test to check what you have learned in this unit.

**Duration:** 0 hrs 30 mins  
**Scoring:** 50 points

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**UNIT 3: POLYNOMIAL FUNCTIONS**

**LESSON 1: POLYNOMIAL BASICS**

**Study: Polynomial Basics**
Learn that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

**Duration:** 0 hrs 35 mins  
**Scoring:** 0 points

**Checkup: Practice Problems**
Check your understanding of the lesson.

**Duration:** 0 hrs 25 mins  
**Scoring:** 0 points

**Quiz: Polynomial Basics**
Take a quiz to check your understanding of what you have learned.

**Duration:** 0 hrs 20 mins  
**Scoring:** 0 points

**Practice: Modeling: Multiplying Polynomials**
Use tiles to model the multiplication of binomials and solve a real-world problem.

**Duration:** 0 hrs 30 mins  
**Scoring:** 20 points

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**LESSON 2: POLYNOMIAL FUNCTIONS**

**Study: Polynomial Functions**
Learn to identify, classify, evaluate, and graph polynomial functions and expressions. Practice writing polynomials in descending order, as well as using the degree of a given polynomial function to predict the general shape of its graph.

**Duration:** 0 hrs 35 mins  
**Scoring:** 0 points
Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Polynomial Functions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 3: SYNTHETIC DIVISION
Study: Synthetic Division
Learn two methods for dividing polynomials — long division and synthetic division. Use synthetic division to expedite
the process of finding factors and roots of polynomial expressions.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Synthetic Division
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 4: FACTORING POLYNOMIALS COMPLETELY
Study: Factoring Polynomials Completely
Learn about the remainder-factor theorem, rational-roots theorem, complex-conjugate theorem, and conjugate-radical
theorem. Learn to use synthetic division to factor higher-order polynomials.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Remainder and Factor Theorems
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Factoring Polynomials Completely
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 5: SOLVING POLYNOMIAL EQUATIONS
Study: Solving Polynomial Equations
Find all solutions to polynomial equations.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on solving polynomial equations.
Duration: 0 hrs 25 mins

Quiz: Solving Polynomial Equations
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 6: GRAPHING POLYNOMIAL FUNCTIONS
Study: Graphs of Polynomial Functions
Learn to graph polynomial functions, identify zeros and write a polynomial function from its zeros.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems

Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

**Quiz: Graphs of Polynomial Functions**
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

**Journal: Designing a Mountain Landscape**
Discuss with a peer the process for using binomials to design a curved mountain landscape.
Duration: 0 hrs 30 mins Scoring: 20 points

**LESSON 7: POLYNOMIAL IDENTITIES**

**Study: Polynomial Identities**
Prove polynomial identities and use them to describe numerical relationships.
Duration: 0 hrs 35 mins Scoring: 0 points

**Checkup: Practice Problems**
Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

**Quiz: Polynomial Identities**
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 8: BINOMIAL THEOREM**

**Study: Binomial Theorem**
Learn and apply the binomial theorem.
Duration: 0 hrs 35 mins Scoring: 0 points

**Checkup: Practice Problems**
Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

**Quiz: Binomial Theorem**
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 9: TRANSFORMATIONS OF POLYNOMIAL FUNCTIONS**

**Study: Transformations of Polynomial Functions**
Transform polynomial functions.
Duration: 0 hrs 35 mins Scoring: 0 points

**Checkup: Practice Problems**
Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

**Quiz: Transformations of Polynomial Functions**
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

**LESSON 10: POLYNOMIAL FUNCTIONS WRAP-UP**

**Checkup: Practice Problems**
Check your understanding of the unit.
Duration: 0 hrs 25 mins Scoring: 0 points

**Review: Polynomial Functions**
Get ready for the unit test by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points
UNIT 4: RATIONAL EXPRESSIONS AND FUNCTIONS

LESSON 1: PROPORTIONS

Study: Proportions
Learn the definition of a rational expression and about using proportional reasoning to solve problems. Explore real-world examples of proportional reasoning.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Proportions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: RATIONAL EXPRESSIONS

Study: Rational Expressions
Learn about finding the value of a rational expression and about undefined rational expressions.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Rational Expressions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 3: SIMPLIFYING RATIONAL EXPRESSIONS

Study: Simplifying Rational Expressions
Practice finding and dividing out common factors in numerators and denominators of rational expressions. Explore the crucial difference between common factors and terms.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Simplifying Rational Expressions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 4: MULTIPLYING AND DIVIDING RATIONAL EXPRESSIONS

Study: Multiplying and Dividing Rational Expressions
Review multiplying and dividing numerical fractions, multiplying rational expressions, dividing rational expressions, and simplifying the results.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
LESSON 5: ADDING AND SUBTRACTING RATIONAL EXPRESSIONS

Study: Adding and Subtracting Rational Expressions
Review adding and subtracting numerical fractions, adding and subtracting rational expressions with like denominators, finding least common denominators, finding multiples of rational expressions, and adding and subtracting rational expressions with unlike denominators.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Adding and Subtracting Rational Expressions
Take a quiz to check your understanding of what you have learned.

LESSON 6: INVERSE VARIATION

Study: Inverse Variation
Review direct variation and how increasing input leads to proportionally increasing output. Review inverse variation and how increasing input leads to proportionally decreasing output. Review finding the constant of variation.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Inverse Variation
Take a quiz to check your understanding of what you have learned.

Practice: Modeling: Finding the Constant in Inverse Variation
Create a graph using a table of inverse variation data, and determine a constant value to create an approximate functional model.

LESSON 7: SOLVING RATIONAL FUNCTIONS

Study: Solving Rational Functions
Learn the definition of a rational function and how to find the domain of a given function. Explore the horizontal and vertical asymptotes of rational functions.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Rational Functions
Take a quiz to check your understanding of what you have learned.

LESSON 8: VERTICAL ASYMPTOTES
LESSON 9: GRAPHING RATIONAL FUNCTIONS

Study: Graphing Rational Functions
Learn about graphing rational functions with variables in the numerator, constructing a sign chart, and picking test numbers. Learn about rational functions with a singular point.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Graphing Rational Functions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 10: RATIONAL EXPRESSIONS AND FUNCTIONS WRAP-UP

Checkup: Practice Problems
Submit your work for a set of 20 practice problems.
Duration: 0 hrs 25 mins Scoring: 0 points

Review: Rational Expressions and Functions
Get ready for the unit test by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Test (CS): Rational Expressions and Functions
Take a computer-scored test to check what you have learned in this unit.
Duration: 0 hrs 40 mins Scoring: 50 points

Test (TS): Rational Expressions and Functions
Take a teacher-scored test to check what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 5: EXPONENTIAL AND LOGARITHMIC FUNCTIONS

LESSON 1: EXPONENTIAL FUNCTIONS

Study: Exponential Functions
Define the standard form of an exponential function and explore a variety of its applications, such as exponential growth and decay (in the forms of doubling time and half-life), as well as compound interest. Compare compound interest to continuously compounded interest using the irrational number \( e \).
LESSON 2: EXAMPLES AND APPLICATIONS OF EXPONENTIAL FUNCTIONS

Study: Examples and Applications of Exponential Functions
Explore case studies in exponential growth and decay and logarithmic growth.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

LESSON 3: GRAPHS OF EXPONENTIAL FUNCTIONS

Study: Graphs of Exponential Functions
Learn about the shape of graphs of exponential functions with various bases and about finding the domain and range of exponential functions.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Graphs of Exponential Functions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Exponential vs. Quadratic
Interpret a table of cell growth data, and discuss with a peer.
Duration: 0 hrs 30 mins Scoring: 20 points

LESSON 4: LOGARITHMIC FUNCTIONS

Study: Logarithmic Functions
Learn about undoing exponential functions, graphing the inverse of an exponential or logarithmic function, and using the common and natural logarithm.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Logarithmic Functions
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 5: GRAPHS OF LOGARITHMIC FUNCTIONS

Study: Graphs of Logarithmic Functions
Learn about the shape of graphs of logarithmic functions with various bases and about the domain and range of logarithmic functions.
LESSON 6: PROPERTIES OF EXPONENTS AND LOGARITHMS

Study: Properties of Exponents and Logarithms
Learn about product, quotient, and power laws of exponents; rewriting the log of a product as the sum of two logs; rewriting the log of a quotient as the difference of two logs; simplifying the log of a power; and using the change-of-base formula to rewrite logarithms.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Equivalent Exponential Expressions
Take a quiz to check your understanding of what you have learned.

Quiz: Equivalent Logarithmic Expressions
Take a quiz to check your understanding of what you have learned.

Quiz: Evaluating Logarithms
Take a quiz to check your understanding of what you have learned.

LESSON 7: SOLVING EXPONENTIAL EQUATIONS

Study: Solving Exponential Equations
Learn about using ordinary algebra and the properties of logarithms to solve exponential equations. Answer questions inspired by the classic chessboard problem.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Solving Exponential Equations
Take a quiz to check your understanding of what you have learned.

LESSON 8: SOLVING LOGARITHMIC EQUATIONS

Study: Solving Logarithmic Equations
Learn about using ordinary algebra and the definition of a logarithm to solve logarithmic equations. Answer questions about energy in earthquakes.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Solving Logarithmic Equations
Take a quiz to check your understanding of what you have learned.
LESSON 9: APPLICATIONS OF LOGARITHMS

Study: Applications of Logarithms
Solve application problems involving exponential and logarithmic expressions.
Duration: 0 hrs 35 mins

Checkup: Practice Problems
Complete a set of practice problems on applications of logarithms.
Duration: 0 hrs 25 mins

Quiz: Applications of Logarithms
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 10: COMPARING AND ANALYZING FUNCTION TYPES

Study: Comparing and Analyzing Function Types
Apply transformations to a variety of function families.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Comparing and Analyzing Function Types
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 11: EXPONENTIAL AND LOGARITHMIC FUNCTIONS WRAP-UP

Checkup: Practice Problems
Submit your work for a set of 20 practice problems.
Duration: 0 hrs 25 mins

Review: Exponential and Logarithmic Functions
Get ready for the unit test by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Test (CS): Exponential and Logarithmic Functions
Take a computer-scored test to check what you have learned in this unit.
Duration: 0 hrs 40 mins Scoring: 48 points

Test (TS): Exponential and Logarithmic Functions
Take a teacher-scored test to check what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 6: SEMESTER 1 EXAM

LESSON 1: SEMESTER 1 EXAM

Review: Semester 1 Exam
Get ready for the semester exam by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Exam: Semester 1 Exam
Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in Semester 1.
Duration: 0 hrs 50 mins Scoring: 180 points

UNIT 7: STATISTICAL ANALYSIS

LESSON 1: REVIEW OF GRAPHICAL ANALYSIS OF DATA

Study: Review of Graphical Analysis of Data
Learn about the different ways to express data graphically and the various shapes or properties these representations have.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Types of Data Displays**
Take a quiz to check your understanding of what you have learned.

**Quiz: Graphical Data Analysis**
Take a quiz to check your understanding of what you have learned.

**LESSON 2: REVIEW OF NUMERICAL ANALYSIS OF DATA**

**Study: Review of Numerical Analysis of Data**
Learn about the numerical analysis of data as it relates to means, medians, modes, IQR, outliers, test quartiles, box plots, variance, and standard deviation.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Measures of Central Tendency**
Take a quiz to check your understanding of what you have learned.

**Quiz: Quartiles and Box Plots**
Take a quiz to check your understanding of what you have learned.

**Quiz: Measures of Spread**
Take a quiz to check your understanding of what you have learned.

**LESSON 3: DATA GATHERING AND INFERENTIAL STATISTICS**

**Study: Data Gathering and Inferential Statistics**
Investigate techniques for gathering data and explore how probability is used in statistical inference.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Data Gathering and Inferential Statistics**
Take a quiz to check your understanding of what you have learned.

**LESSON 4: RANDOM VARIABLES**

**Study: Random Variables**
Explore random variable concepts such as discrete continuous variables, histograms, density curves, mean, standard deviation of discrete random variables, normal curve, and z-score percentiles.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.
Quiz: Random Variables
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Normal Curves
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Journal: Cell Phone Battery Life
Evaluate the design and results of an experiment with a peer.
Duration: 0 hrs 30 mins Scoring: 20 points

LESSON 5: EXPERIMENTAL DESIGN
Study: Experimental Design
Learn how to design and carry out an experiment employing the basic principles of experimental design.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Sampling and Simulation
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

Quiz: Experimental Design
Take a quiz to check your understanding of what you have learned.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 6: EVALUATING PUBLISHED REPORTS
Study: Evaluating Published Reports
Learn how to evaluate the design of a study, the appropriateness of its analysis, and the validity of its conclusions.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Evaluating Published Reports
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 7: APPLICATIONS OF STATISTICAL TECHNIQUES
Study: Applications of Statistical Techniques
Learn how statistical techniques are used to analyze real-world observational studies and experimental designs.
Duration: 0 hrs 35 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Applications of Statistical Techniques
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Practice: Modeling: Statistical Truth or Fiction?
Evaluate gathered data and make a prediction using statistical techniques.
LESSON 8: STATISTICAL ANALYSIS WRAP-UP

Checkup: Practice Problems
Submit your work for a set of 20 practice problems.
Duration: 0 hrs 25 mins

Review: Statistical Analysis
Get ready for the unit test by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Test (CS): Statistical Analysis
Take a computer-scored test to check what you have learned in this unit.
Duration: 0 hrs 40 mins Scoring: 50 points

Test (TS): Statistical Analysis
Take a teacher-scored test to check what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 8: BIVARIATE DATA

LESSON 1: SCATTERPLOTS

Study: Scatterplots
Learn how to construct and interpret scatterplots.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Scatterplots
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: CORRELATION COEFFICIENTS

Study: Correlation Coefficients
Learn how to calculate and interpret Pearson's sample correlation coefficient.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Correlation Coefficients
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 3: LINEAR REGRESSION

Study: Linear Regression
Learn how to calculate a linear regression equation, interpret the slope and intercept in context, and identify influential points (compared to large residuals).
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Linear Regression
Take a quiz to assess your understanding of the material.
**LESSON 4: ASSESSING LINEAR REGRESSION**

**Study: Assessing Linear Regression**
Learn how to interpret correlation coefficients ($r$-values), coefficients of determination ($r^2$-values), and residual plots.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Assessing Linear Regression**
Take a quiz to assess your understanding of the material.

**LESSON 5: TRANSFORMING BIVARIATE DATA**

**Study: Transforming Bivariate Data**
Learn how to transform data so that a linear regression equation can be used to model nonlinear relationships.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.

**Quiz: Transforming Bivariate Data**
Take a quiz to assess your understanding of the material.

**Discuss: Transforming Real-World Bivariate Data**
Join a three- to five-question discussion to practice methods learned in this unit.

**LESSON 6: BIVARIATE DATA WRAP-UP**

**Practice: Assignment**
Submit your work for a set of 20 practice problems.

**Review: Bivariate Data**
Prepare for the unit test by reviewing key concepts and skills.

**Test (CS): Bivariate Data**
Take a computer-scored test to assess what you have learned in this unit.

**Test (TS): Bivariate Data**
Take a teacher-scored test to assess what you have learned in this unit.

**UNIT 9: PROBABILITY**

**LESSON 1: RANDOM OUTCOMES, SAMPLE SPACE, AND EVENTS**

**Study: Random Outcomes, Sample Space, and Events**
Learn how to anticipate all possible outcomes of a chance experiment and list specific outcomes associated with defined events.

**Checkup: Practice Problems**
Complete a set of practice problems to check your understanding of the lesson.
Lesson 2: General Probability Rules

Study: General Probability Rules
Learn how to apply the general addition and complement rules for two events, and learn to use and read Venn diagrams when solving probability problems.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: General Probability Rules
Take a quiz to assess your understanding of the material.

Lesson 3: Conditional Probability

Study: Conditional Probability
Learn how to identify and solve conditional probability problems using correct notation, formulas, and tables.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Conditional Probability
Take a quiz to assess your understanding of the material.

Lesson 4: Independence

Study: Independence
Learn how to show if two events are independent, and solve probability problems for both independent and dependent events using the multiplication rule and tree diagrams.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Independence
Take a quiz to assess your understanding of the material.

Lesson 5: Bayes's Theorem

Study: Bayes's Theorem
Learn how to identify and solve probability problems using Bayes's theorem.

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.

Quiz: Bayes's Theorem
Take a quiz to assess your understanding of the material.
LESSON 6: SIMULATIONS

Study: Simulations
Learn how to simulate a random event using random number generators and rows of random digits and use results to estimate probabilities empirically.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Simulations
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

Discuss: Using Simulations to Explore Real-World Concerns
Join a three- to five-question discussion to practice methods learned in this unit.
Duration: 0 hrs 20 mins Scoring: 30 points

LESSON 7: PROBABILITY WRAP-UP

Practice: Assignment
Submit your work for a set of 20 practice problems.
Duration: 0 hrs 40 mins Scoring: 100 points

Review: Probability
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Probability
Take a computer-scored test to assess what you have learned in this unit.
Duration: 0 hrs 40 mins Scoring: 50 points

Test (TS): Probability
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 10: PROBABILITY DISTRIBUTIONS

LESSON 1: DISCRETE RANDOM VARIABLES

Study: Discrete Random Variables
Learn how to identify a discrete random variable and calculate its probability distribution, mean, and standard deviation.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Discrete Random Variables
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 20 points

LESSON 2: CONTINUOUS RANDOM VARIABLES

Study: Continuous Random Variables
Learn how to identify a continuous random variable and calculate its probability distribution.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points
LESSON 3: BINOMIAL PROBABILITY DISTRIBUTIONS

Study: Binomial Probability Distributions
Learn how to calculate binomial probability distributions, including mean and standard deviation.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Binomial Probability Distributions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 0 points

LESSON 4: GEOMETRIC PROBABILITY DISTRIBUTIONS

Study: Geometric Probability Distributions
Learn how to identify and calculate geometric probability distributions.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Geometric Probability Distributions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 0 points

LESSON 5: NORMAL DISTRIBUTIONS

Study: Normal Distributions
Learn how to identify properties of a normal distribution and then apply these properties to determine probabilities with a table or graphing calculator.
Duration: 0 hrs 40 mins Scoring: 0 points

Checkup: Practice Problems
Complete a set of practice problems to check your understanding of the lesson.
Duration: 0 hrs 25 mins Scoring: 0 points

Quiz: Normal Distributions
Take a quiz to assess your understanding of the material.
Duration: 0 hrs 20 mins Scoring: 0 points

Discuss: Checking for Normal Probability Distributions
Join a three- to five-question discussion to practice methods learned in this unit.
Duration: 0 hrs 20 mins Scoring: 30 points

LESSON 6: PROBABILITY DISTRIBUTIONS WRAP-UP

Practice: Assignment
Submit your work for a set of 20 practice problems.
Duration: 0 hrs 40 mins Scoring: 100 points

Review: Probability Distributions
Prepare for the unit test by reviewing key concepts and skills.
Duration: 0 hrs 30 mins Scoring: 0 points

Test (CS): Probability Distributions
Take a computer-scored test to assess what you have learned in this unit.
Test (TS): Probability Distributions
Take a teacher-scored test to assess what you have learned in this unit.
Duration: 0 hrs 30 mins Scoring: 50 points

UNIT 11: SEMESTER 2 EXAM
LESSON 1: SEMESTER 2 EXAM

Review: Semester 2 Exam
Get ready for the semester exam by reviewing important ideas and skills.
Duration: 0 hrs 20 mins Scoring: 0 points

Exam: Semester 2 Exam
Take a computer-scored exam to demonstrate your mastery of concepts and skills covered in Semester 2.
Duration: 0 hrs 50 mins Scoring: 135 points