

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?
- Lesson 2: Graphing Functions
- Lesson 3: Linear Functions
- Lesson 4: Linear Equations and Inequalities
- Lesson 5: Linear Systems
- Lesson 6: Functions and Relations Wrap-Up

UNIT 2: QUADRATIC FUNCTIONS

- Lesson 1: Factoring $x^2 + bx + c$
- Lesson 2: Factoring $ax^2 + bx + c$
- Lesson 3: Special Cases
- Lesson 4: Solving Quadratic Equations
- Lesson 5: Completing the Square
- Lesson 6: The Quadratic Formula
- Lesson 7: Graphs of Quadratic Functions
- Lesson 8: Imaginary Numbers
- Lesson 9: Nonlinear Systems of Equations
- Lesson 10: Nonlinear Systems of Inequalities
- Lesson 11: Quadratic Functions Wrap-Up

UNIT 3: POLYNOMIAL FUNCTIONS

- Lesson 1: Polynomial Basics
- Lesson 2: Polynomial Functions
- Lesson 3: Synthetic Division
- Lesson 4: Factoring Polynomials Completely
- Lesson 5: Solving Polynomial Equations
- Lesson 6: Graphing Polynomial Functions
- Lesson 7: Polynomial Identities
- Lesson 8: Binomial Theorem
- Lesson 9: Transformations of Polynomial Functions
- Lesson 10: Polynomial Functions Wrap-Up

UNIT 4: RATIONAL EXPRESSIONS AND FUNCTIONS

- Lesson 1: Proportions
- Lesson 2: Rational Expressions
- Lesson 3: Simplifying Rational Expressions
- Lesson 4: Multiplying and Dividing Rational Expressions

- Lesson 5: Adding and Subtracting Rational Expressions
- Lesson 6: Inverse Variation
- Lesson 7: Solving Rational Functions
- Lesson 8: Vertical Asymptotes
- Lesson 9: Graphing Rational Functions
- Lesson 10: Rational Expressions and Functions Wrap-Up

UNIT 5: EXPONENTIAL AND LOGARITHMIC FUNCTIONS

- Lesson 1: Exponential Functions
- Lesson 2: Examples and Applications of Exponential Functions
- Lesson 3: Graphs of Exponential Functions
- Lesson 4: Logarithmic Functions
- Lesson 5: Graphs of Logarithmic Functions
- Lesson 6: Properties of Exponents and Logarithms
- Lesson 7: Solving Exponential Equations
- Lesson 8: Solving Logarithmic Equations
- Lesson 9: Applications of Logarithms
- Lesson 10: Comparing and Analyzing Function Types
- Lesson 11: Exponential and Logarithmic Functions Wrap-Up

UNIT 6: SEMESTER 1 EXAM

- Lesson 1: Semester 1 Exam

UNIT 7: STATISTICAL ANALYSIS

- Lesson 1: Review of Graphical Analysis of Data
- Lesson 2: Review of Numerical Analysis of Data
- Lesson 3: Data Gathering and Inferential Statistics
- Lesson 4: Random Variables
- Lesson 5: Experimental Design
- Lesson 6: Evaluating Published Reports
- Lesson 7: Applications of Statistical Techniques
- Lesson 8: Statistical Analysis Wrap-Up

UNIT 8: BIVARIATE DATA

- Lesson 1: Scatterplots
- Lesson 2: Correlation Coefficients
- Lesson 3: Linear Regression
- Lesson 4: Assessing Linear Regression
- Lesson 5: Transforming Bivariate Data
- Lesson 6: Bivariate Data Wrap-Up

UNIT 9: PROBABILITY

- Lesson 1: Random Outcomes, Sample Space, and Events
- Lesson 2: General Probability Rules
- Lesson 3: Conditional Probability
- Lesson 4: Independence
- Lesson 5: Bayes's Theorem
- Lesson 6: Simulations
- Lesson 7: Probability Wrap-Up

UNIT 10: PROBABILITY DISTRIBUTIONS

- Lesson 1: Discrete Random Variables
- Lesson 2: Continuous Random Variables

- Lesson 3: Binomial Probability Distributions
- Lesson 4: Geometric Probability Distributions
- Lesson 5: Normal Distributions
- Lesson 6: Probability Distributions Wrap-Up

UNIT 11: SEMESTER 2 EXAM

- Lesson 1: Semester 2 Exam