Unit	Lesson	Lesson Objectives

Inferences and Conclusions from Data

Designing a Study
- Analyze study types and sampling methods.
- Classify sampling methods.
- Classify study types.
- Determine if a sample is biased.

Representing Data
- Describe a data set using measures of central tendency and range.
- Determine if a representation of data is misleading.

Standard Deviation
- Calculate variance and standard deviation of a sample or population.
- Determine if a value is within a given z-score.
- Interpret standard deviation as it pertains to the spread of a graph.

Properties of Probability Distributions
- Create probability distributions from a data set.
- Identify properties of a probability distribution.
- Solve problems using probability distributions.

Expected Value
- Calculate expected values.
- Use expected values to make decisions.

Binomial Distribution
- Calculate binomial probabilities.
- Identify a binomial experiment.
- Identify the probability of success, probability of failure, and number of trials for a binomial experiment.

Introduction to Normal Distributions
- Apply the z-score formula to solve problems.
- Describe normal distributions using the mean and standard deviation.
- Solve problems using the empirical rule.

Applications with Standard Normal Distribution
- Solve problems using the standard normal table.

Statistical Inferences
- Make inferences about a population from a sample.

Hypothesis Testing
- Determine if a result is statistically significant.
- Perform hypothesis tests on normally distributed data.

Polynomials, Rational, and Radical Relationships: Part One

Real Numbers
- Classify real numbers.
- Identify the field properties of real numbers.
- Represent real numbers with variables.

Solving Quadratic Equations by Factoring

Find real solutions for quadratic equations using the zero product property.

Use key attributes of a quadratic function to solve word problems.

Completing The Square

Find complex solutions to quadratic equations by completing the square.

Recognize the pattern of a perfect-square trinomial as the square of a binomial.

Use the square root property to solve equations.

Modeling with Quadratic Equations

Use quadratic equations to model and solve real-world problems.

Square Root Functions

Find the domain of a square root function.

Find the inverse of a quadratic function.

Addition and Subtraction of Polynomials

Perform addition and subtraction of polynomials.

Multiplication of Polynomials

Perform multiplication of polynomials.

Sum and Difference of Two Cubes

Factor the sum or difference of two cubes.

Recognize a perfect cube and find its cube root.

Factoring Polynomials Completely

Analyze polynomial expressions to factor them completely.

Division of Polynomials

Use inverse operations to check the result of polynomial division

Use long division to find quotients of polynomials

Polynomials, Rational, and Radical Relationships: Part Two

The Binomial Theorem

Use the Binomial theorem to expand binomials.

Use the Binomial theorem to find a specific term in an expansion.

Simplifying Polynomial Expressions

Simplify expressions involving operations with polynomials.

Synthetic Division and the Remainder Theorem

Apply the remainder theorem.

Use synthetic division to divide a polynomial by a linear factor.

The Rational Roots Theorem

Determine the roots of and factor a polynomial function.

Use the rational root theorem to determine possible roots of a polynomial function.

The Fundamental Theorem of Algebra

Apply the fundamental theorem of algebra to determine the number of roots of a polynomial function.

Use the complex conjugate theorem to factor and solve polynomial equations.

Writing Polynomial Functions from Complex Roots

Write polynomial functions from complex roots.

Quadratic in Form Polynomials
Identify fourth degree equations that are quadratic in form and use an appropriate u-substitution.
Solve fourth degree equations that are quadratic in form.

Graphing Polynomial Functions
Graph polynomial functions using key features.

Solving Polynomial Equations using Technology
Use technology to solve or approximate solutions of one-variable polynomial equations.

Geometric Series
Apply geometric series to solve mathematical and real-world problems.
Find sums of finite and infinite geometric series.

Polynomials, Rational, and Radical Relationships: Part Three

Simplifying Rational Expressions
Simplify rational expressions using laws of integer exponents.

Multiplying and Dividing Rational Expressions
Perform multiplication and division of rational expressions.

Adding and Subtracting Rational Expressions
Perform addition and subtraction of rational expressions.
Simplify complex rational expressions containing sums or differences.

Rational Equations
Determine the reasonableness of a solution to a rational equation.
Solve rational equations and determine extraneous solutions.
Use rational equations to model and solve real-world problems.

Graphing Radical Functions
Determine the domain and range of square root and cube root functions.
Relate transformations to the graphs of square root and cube root functions to their parent function.

Radical Equations and Extraneous Roots
Model and solve mathematical and real-world problems using radical equations, and determine extraneous roots.

Solving Equations Containing Two Radicals
Solve equations containing two radicals, and determine extraneous solutions.

Trigonometry of General Triangles and Trigonometric Functions

Law of Sines
Apply the law of sines to solve real-world problems.
Complete the steps to prove the law of sines.
Solve mathematical problems using the law of sines.

Law of Cosines
Apply the law of cosines to solve real-world problems.
Complete the steps to prove the law of cosines.
Solve mathematical problems using the law of cosines.

Area and Perimeter of Triangles
Derive the area formula $A = 1/2absinC$.
Solve area and perimeter problems using $A = 1/2absinC$.
Solve area and perimeter problems using Heron's formula.

Angles in Standard Position
Determine angles that are coterminal.
Identify characteristics of angles in standard position.

Radian Measure
Convert between degree and radian measure.
Use the definition of radian measure to calculate arc lengths, radii, and angle measures.

The Unit Circle
Compare sine, cosine, and tangent values for angles having the same reference angle.
Find the sine, cosine, and tangent values of angle measures using the unit circle.

Evaluating the Six Trigonometric Functions
Evaluate the six trigonometric functions for angles in degrees or radians based on one or more given trigonometric function values.
Evaluate the six trigonometric functions for angles in degrees or radians given a point on the terminal ray.

Graphing Sine and Cosine
Analyze key features of sine and cosine functions from equations and graphs.

Modeling with Periodic Functions
Model and solve real-world problems using periodic functions.

Mathematical Modeling: Part One

Inequalities
Create one-variable linear inequalities in one variable and use them to solve problems.
Solve one-variable linear inequalities, including compound inequalities, and represent the solution sets graphically and algebraically.

Literal Equations
Determine if expressions are equivalent.
Solve a literal equation in terms of a given variable.

Function Operations
Combine functions using arithmetic operations, expressing the results both algebraically and graphically.
Evaluate sums, differences, products, and quotients of functions.

Function Inverses
Find the inverse of a function.
Use composition to verify that functions are inverses.

Rate of Change
Calculate the average rate of change of a function over a specified interval.
Interpret the average rate of change of a function over a specified interval.
Solve problems involving direct variation.

Solving Linear Systems Graphically
Classify systems of two-variable equations as dependent, independent, consistent, or inconsistent.
Solve systems of two-variable linear equations graphically.
Solve systems of two-variable linear inequalities.

Solving Linear Systems by Elimination
Solve systems of two-variable linear equations using elimination.

Linear Programming
Maximize a function given constraints.
Represent and solve real-world problems using linear programming.

Solving One-Variable Equations with Systems
Solve a one-variable linear or quadratic equation by graphing a related system of equations.

Mathematical Modeling: Part Two

Negative Exponents
Evaluate numeric expressions using laws of integer exponents.

Simplify single-variable expressions using laws of integer exponents.

Graphing Exponential Functions
Determine the domain and range of exponential functions.

Graph exponential functions.

Identify exponential functions.

Solving Exponential Equations by Rewriting the Base
Solve exponential equations by rewriting bases.

Graphing Logarithmic Functions
Determine the domain and range of logarithmic functions.

Identify and analyze the graphs of logarithmic functions.

Identify logarithmic functions.

Evaluating Logarithmic Expressions
Evaluate common logarithms using a calculator.

Evaluate logarithmic expressions by converting between logarithmic and exponential forms.

Solve logarithmic equations by converting between logarithmic and exponential forms.

Solving Logarithmic Equations using Technology
Rewrite logarithmic expressions using the change of base algorithm.

Solve a one-variable equation containing logarithms by transforming it into a system of equations.

Properties of Logarithms
Evaluate, expand, and simplify logarithmic expressions using properties of logarithms.

Solving Equations using Properties of Logarithms
Apply properties of logarithms to solve logarithmic equations.

Determine extraneous solutions of logarithmic equations.

Base e
Analyze exponential and logarithmic functions in base e to determine key features of the graph.

Apply properties of logarithms and exponents to solve exponential and logarithmic equations having base e.

Determine the domain and range of exponential and logarithmic functions in base e.

Solving Exponential and Logarithmic Equations
Solve exponential and logarithmic equations using inverses, properties, and algorithms.

Modeling with Exponential and Logarithmic Equations
Model and solve real-world problems using exponential and logarithmic functions.

Rewriting Exponential Functions
Use alternative forms of an exponential function to highlight different information about that function and the real-world situation it models.

Write exponential functions and expressions in equivalent forms, using the properties of exponents to justify steps.

Mathematical Modeling: Part Three

Absolute Value Functions
Analyze absolute value functions to determine key features of the graph.
Model and solve mathematical and real-world problems with absolute value functions.

Absolute Value Inequalities
Rewrite absolute value inequalities as compound inequalities.
Solve absolute value inequalities graphically and algebraically.

Piecewise Defined Functions
Determine the domain, range, and continuity of piecewise defined functions.
Evaluate piecewise defined functions.
Graph piecewise defined functions.

Step Functions
Analyze step functions to determine key features of the graph.
Evaluate step functions.
Use step functions to model real-world problems.

Joint and Combined Variation
Find constants of variation.
Model and solve problems involving joint and combined variation.

Transformations of Functions
Analyze a function rule or graph to determine transformations of the parent function.
Identify a function as belonging to a family of functions.

Domain and Range
Determine the domain and range of a function in both mathematical and real-world contexts.

Analyzing Compositions of Functions
Determine the domain and range of the composition of functions.
Find compositions of functions from a variety of function families.

Modeling with Functions
Find the equation of a function that best models a data set.
Use function models to solve problems.

Performance Task: Production Schemes
Determine the reasonableness of a function model.
Use an appropriate function model to describe random data.
Use function models to make predictions about situations.

Mathematical Modeling: Part Four

Trapezoids and Kites
Apply properties of kites to solve mathematical and real-world problems.
Apply properties of trapezoids to solve mathematical and real-world problems.
Complete proofs involving properties of trapezoids and kites.

Area of Composite Figures
Calculate the area of composite 2-D figures, including real-world applications.
Decompose composite 2-D figures.
Write an expression that represents the area of a composite 2-D figure.

Density and Design Problems

Solve problems involving density of an area.

Use geometric concepts to solve design problems.

Three-Dimensional Figures and Cross Sections

Classify a 3-D figure and identify the characteristics (base, edge, etc.).

Determine the 3-D figure generated by a rotation of a 2-D figure.

Determine the horizontal and vertical cross-sections of 3-D figures.

Volume of Prisms

Calculate the volume or an unknown measure of a right prism based on a mathematical or real-world model.

Calculate the volume or an unknown measure of an oblique prism based on a mathematical or real-world model.

Write expressions to represent the volumes or unknown measures of right and oblique prisms.