

Options EHS Applied Math A		Scope and Sequence
Unit	Lesson	Objectives
Extending the Number System		
	Function Notation	<p>Interpret function notation that models a real-world situation.</p> <p>Identify the input and output of a functional relationship, pointing out constraints on the domain and range.</p> <p>Use function notation to represent a functional relationship.</p>
	Evaluating Functions	<p>Analyze a function represented by an equation, table, or graph to determine the output when given the input, and vice versa.</p> <p>Find input and output values of two functions graphed in the same coordinate plane.</p> <p>Write the inverse of a given linear function.</p>
	Literal Equations	Rearrange a literal equation to highlight a quantity of interest and use it to solve problems.
	Translations of Exponential Functions	<p>Graph translations of exponential functions.</p> <p>Analyze key aspects of exponential functions that have been translated.</p>
	Introduction to Polynomials	<p>Identify a polynomial and its equivalent forms.</p> <p>Classify a polynomial by degree and number of terms.</p>
	Adding and Subtracting Polynomials	<p>Add and subtract polynomials, determining the degree and number of terms of the sum or difference.</p> <p>Find and evaluate polynomial sums or differences that model real-world situations.</p>

Unit Lesson**Objectives**

Multiplying Monomials and Binomials

Multiply a binomial by a monomial or binomial algebraically and by using geometric models.

Identify a product that results in the difference of squares or a perfect square trinomial.

Multiplying Polynomials and Simplifying Expressions

Multiply a binomial by a trinomial algebraically and by using geometric models.

Interpret the structure of an expression involving addition, subtraction, and multiplication of polynomials in order to write it as a single polynomial in standard form.

Unit Test

Nonlinear Functions

Solving Absolute Value Equations

Solve absolute value equations using tables or algebra, pointing out solutions that are viable or not viable in a modeling context.

Create absolute value equations to model and solve problems.

Absolute Value Inequalities

Rewrite absolute value inequalities as compound inequalities.

Solve absolute value inequalities graphically and algebraically.

Linear Piecewise Defined Functions

Relate the graph of a piecewise-defined function to its algebraic representation, limiting it to linear functions over its domain.

Evaluate a piecewise-defined function that is defined by linear functions over all intervals of its domain.

Graph a piecewise-defined function that is defined by linear functions over all intervals of its domain.

State the domain and range of linear piecewise-defined functions.

Unit Lesson**Objectives**

Step Functions

Interpret a step function in terms of the problem it models.

Evaluate a step function.

Graph a step function.

State the domain and range of step functions.

Absolute Value Functions and Translations

Graph the absolute value function and its translations.

Analyze key features of the absolute value function and its translations.

The Square Root Function

Simplify a square root whose radicand is a perfect square.

Graph the square root function and reflections over the axes.

State the domain and range of square root functions.

The Cube Root Function

Graph the cube root function, and translations and reflections of it.

State the key features of the cube root function, and translations and reflections of it.

Rewriting Exponential Functions

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

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

Unit Test

Polynomial Expressions

Unit Lesson**Objectives**

Factoring Polynomials: GCF

Determine the greatest common monomial factor of two or more terms.

Write a polynomial as the product of a monomial and polynomial having the same number of terms.

Determine an appropriate way to factor a polynomial for a given context.

Factoring Polynomials: Double Grouping

Factor a polynomial by double grouping or indicate that the polynomial is prime.

Factoring Trinomials: $a = 1$

Determine if a trinomial with a leading coefficient of 1 and a positive constant is factorable and, if so, write it in factored form.

Relate the factorization of a trinomial with a leading coefficient of 1 and a positive constant to a geometric model.

Factoring Trinomials: $a > 1$

Determine if a trinomial with a leading coefficient greater than 1 is factorable and, if so, write it in factored form.

Relate the factorization of a trinomial with a leading coefficient greater than 1 to a geometric model.

Factoring Polynomials: Difference of Squares

Identify a monomial that is a perfect square and find the square root.

Determine if a polynomial is factorable by recognizing that it is a difference of two squares and, if so, applying the identity.

Factoring Polynomials: Sum and Difference of Cubes

Identify a monomial that is a perfect cube and find the cube root.

Determine if a polynomial is factorable by recognizing that it is a sum or difference of two cubes and, if so, applying the identity.

Unit Test

Unit Lesson

Objectives

Quadratic Functions and Modeling

Introduction to Quadratic Functions

Identify a quadratic function and the values of the coefficients and constant from the standard form.

Evaluate a quadratic function using tables, graphs, and equations.

Calculate the rate of change of a quadratic function over an interval of its domain, and compare it to linear and exponential functions.

Quadratic Functions: Standard Form

Graph a quadratic function given in standard form, identifying the key features of the graph.

Quadratic Functions: Factored Form

Multiply a binomial by a monomial or binomial algebraically and by using geometric models.

Identify a product that results in the difference of squares or a perfect square trinomial.

Quadratic Functions: Vertex Form

Graph a quadratic function given in vertex form, identifying the key features of the graph.

Relate the parameters of a quadratic function in vertex form to transformations of the graph $y = x^2$.

Completing the Square

Relate the geometric model of completing the square to the algebraic process.

Write quadratic functions given in standard form and with $a = 1$ into vertex form by completing the square.

Determine key aspects of the graph of a quadratic function given in standard form and with $a = 1$ by writing it in vertex form.

Relate the parameters of a quadratic function in vertex form to transformations of the graph $y = x^2$.

Completing the Square (Continued)

Write quadratic functions given in standard form into vertex form by completing the square.

Determine key aspects of the graph of a quadratic function given in standard form by writing it in vertex form.

Unit Lesson

Objectives

Relate the parameters of a quadratic function in vertex form to transformations of the graph $y = x^2$.

Modeling with Quadratic Functions

Write quadratic functions to model problems.

Use quadratic functions to solve mathematical and real-world problems.

Comparing Exponential, Linear, and Quadratic Growth

Use tables and graphs to compare the growth of an exponential function to the growth of a linear function over equal intervals.

Use tables and graphs to compare the growth of an exponential function to the growth of a quadratic or a polynomial function over equal intervals.

Use tables and graphs to show that exponential functions grow by equal factors over equal intervals.

Unit Test

Expressions and Equations: Part One

Solving Quadratic Equations: Zero Product Property

Solve problems by factoring quadratic equations given in standard form.

Write quadratic equations given rational solutions.

Solving Quadratic Equations: Factoring

Write a quadratic equation that models a scenario.

Solve problems by rewriting quadratic equations in standard form and factoring, pointing out the solutions that are viable or not viable in a modeling context.

Solving Quadratic Equations: Square Root Property

Use the square root property to solve quadratic equations.

Solving Quadratic Equations: Completing the Square

Unit Lesson

Objectives

Solve a quadratic equation whose leading coefficient is 1 by completing the square.

Solving Quadratic Equations: Completing the Square (Continued)

Solve a quadratic equation whose leading coefficient is greater than 1 by completing the square.

Introduction to the Quadratic Formula

Justify the steps used to derive the quadratic formula by completing the square.

Determine the values of a , b , and c from a given quadratic equation in standard form.

Recognize an expression that uses the quadratic formula to find the solutions of a quadratic equation.

Relate the discriminant in the quadratic formula to the types of solutions of a quadratic equation.

Solving Quadratic Equations: Quadratic Formula

Solve a quadratic equation using the quadratic formula.

Determine the number of real zeros of a quadratic function by finding the values of a , b , and c , and then calculating the discriminant.

Modeling with Quadratic Equations

Write and solve quadratic equations to model real-world scenarios, estimating where appropriate and identifying solutions that are not viable in terms of the context.

Unit Test

Expressions and Equations: Part Two

Solving Linear-Quadratic Systems

Solve a system of equations consisting of a line and a parabola algebraically and graphically, using technology where appropriate.

Complex Numbers

Represent square roots of negative numbers as multiples of i .

Unit Lesson

Objectives

Represent complex numbers in the form $a + bi$ or in the complex plane.

Simplify powers of i using their cyclic nature.

Determine the absolute value of a complex number.

Operations with Complex Numbers

Identify the field properties of complex numbers.

Perform addition, subtraction, and multiplication of complex numbers.

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.

Find complex solutions to quadratic equations by completing the square.

The Quadratic Formula

Find real and complex solutions of quadratic equations using the quadratic formula.

Use the discriminant to determine the number and type of roots of a quadratic equation.

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.

Cumulative Exam

Cumulative Exam Review

Cumulative Exam