

Teaching Unit: **Properties**

Essential Understandings

From 1-2:

Commutative
Associative
Addition Identity
Multiplication Identity
Additive Inverse
Multiplicative Inverse
Distributive

From 1-3:

Properties of Equality
Reflexive
Symmetric
Transitive
Substitution
Addition and Subtraction Property of Equality
Multiplication and Division Property of Equality

Sub Topic:

Knowledge and Skills

Identify and use the following properties: (1-2)

- Associative
- Commutative
- Additive and Multiplicative Inverse
- Addition and Multiplication Identity
- Distributive

Find additive and multiplicative inverses of real numbers (1-2)

Use properties to simplify expressions (1-2)

Use Addition/Subtraction and Multiplication/Division Properties of equality to solve single variable equations (1-3)

Teaching Unit: **Functions**

Essential Understandings

Relations and Functions (2-1) [see page 56-E]
Linear Equations (2-2) [see page 56-E]
Special Functions (2-6) [see page 56-F]
Operations on Functions (7-1) [see page 382-E]
Inverse Functions and Relations (7-2) [see page 382-E]
Square Root Functions and Inequalities (7-3) [see page 382-E].

Sub Topic:

Knowledge and Skills

Find functional values.
Identify linear equations and functions.
Identify and graph step, constant, and identity functions.
Identify and graph absolute value and piece wise functions.
Find the sum, difference, product and quotient of functions.
Find the inverse of a function or relation.
Graph and analyze square root functions.

Teaching Unit: **Coordinate System**

Essential Understandings

Plotting ordered pairs (2-1)
The coordinate plane
Quadrants
Graphing Relations

Sub Topic:

Knowledge and Skills

Use table and graphs to represent relations.
Graph points on a coordinate plane
Graph algebraic relationships
Graph linear equations using ordered pairs
Find the slope of a line
Determine slopes and y-intercepts of lines
Graph linear equations using slope and y-intercept
Plot two data sets as ordered pairs (scatter plot)
Draw lines of best fit for sets of data
Use lines of fit to make predictions about data.
Draw translations, reflections, and dilation on a coordinate plane.

Teaching Unit: ***Systems of Equations and Inequalities***

Essential Understandings

Systems of Linear equation and inequalities can be used to model real-world situations in which many different conditions must be met. The method of solution for these systems often determines the preciseness of the solution.

Sub Topic:

Knowledge and Skills

Solve systems of linear equations by graphing
Determine whether a system of linear equations is consistent and independent, consistent and dependent, or inconsistent.
Solve systems of linear equations by using substitution.
Solve systems of linear equations by using elimination.
Solve systems of linear equations by using graphing.
Determine the coordinates of the vertices of a region formed by the graph of a system of inequalities.
Use the graphing calculator/laptops to graph systems of linear inequalities.
Find the maximum and minimum values of a function over a region.
Solve real-world problems using linear programming.
Solve systems of linear equations in three variables.
Solve real-world problems using systems of linear equations in three variables.

Teaching Unit: ***Matrices***

Essential Understandings

Introduction to matrices 4.1 [see page 160-E]
Operations with matrices 4.2 "
Multiplying matrices 4.3 "
Transformations with matrices [see page 160-F]
Determinants "
Cramer's Rule "
Inverse Matrices "
Using matrices to solve equations "

Sub Topic:

Knowledge and Skills

Introductions to Matrices (4.1)
Operations with Matrices (4.1)
Multiplying Matrices (4.2)
Determinants (4.5)
Cramer's Rule (4.6)
Identity and Inverse Matrices (4.7)
Using Matrices to solve systems of equations (4.8)

Teaching Unit: **Quadratics**

Essential Understandings

Graphing Quadratic Functions 5.1	[see page 234-E]
Solving Quadratic Equations by Graphing 5.2	"
Solving Quadratic Equations by Factoring 5.3	"
Complex Numbers 5.4	[see page 234-F]
Completing the Square 5.5	"
The Quadratic Formula and the Discriminate 5.6	"
Graphing and Solving Quadratic Inequalities 5.8	

Sub Topic:

Knowledge and Skills

Graph quadratic functions.

Solve and estimate solutions to Quadratic equations by graphing.

Write and solve quadratic equations.

Solve quadratic equations by using the square root property and completing the square.

Solve quadratic equations by using the Quadratic Formula. Use the discriminant to determine the number and type of roots of a quadratic equation.

Graph quadratic inequalities in one and two variables.

Find square roots and perform operations with pure imaginary numbers and complex numbers.

Teaching Unit: **Complex & Imaginary numbers**

Essential Understandings

Complex numbers.	[see page 234-F]
Roots and zeros.	[see page 310-F]

Sub Topic:

Knowledge and Skills

Find square roots and perform operations with pure imaginary numbers. Perform operations with complex numbers.

Determine the number and type of roots for a polynomial equation. Find the zeros of a polynomial function.

Teaching Unit: ***Polynomial Functions***

Essential Understandings

Properties of Exponents (6-1)	[see page 310-E]
Operations with Polynomials (6-2)	"
Dividing Polynomials (6-3)	"
Polynomial Functions (6-4)	[see page 310-E / 310-F]
Solving Polynomial Equations (6-6)	[see page 310-F]
The remainder and factor theorems (6-7)	"
Roots and Zeroes (6-8.	

Sub Topic:

Knowledge and Skills

- Use properties of exponents to multiply and divide monomials.
- Use expressions written in scientific notation.
- Add and subtract polynomials. Multiply polynomials.
- Divide polynomials using long division and synthetic division.
- Evaluate polynomial functions.
- Factor and solve polynomials.
- Evaluate functions using synthetic division. Determine whether a binomial is a factor of a polynomial by using synthetic substitution.
- Determine the number and type of roots for a polynomial equation. Find a zeros of a polynomial function.

Teaching Unit: ***Exponents***

Essential Understandings

Properties of Exponents. 6.1	[see page 310-E]
Rational Exponents. 7.6	[see page 382-F]
Exponential Functions. 9.1	[see page 496-E]

Sub Topic:

Knowledge and Skills

- Use properties of exponents to multiply and divide monomials.
 - Use expressions written in scientific notation.
 - Write expressions with rational exponents in radical form and vice-versa. Simplify expressions in exponential or radical form.
 - Graph exponential functions. Solve exponential equations and inequalities.
-

Teaching Unit: ***Sequences and Series***

Essential Understandings

Arithmetic Sequences [see page 620-E]

Arithmetic Series "

Geometric Sequences "

Geometric Series [see page 620-F]

Infinite Geometric Series "

The Binomial Theorem "

Sub Topic:

Knowledge and Skills

Arithmetic sequences (11.1)

Arithmetic Series (11.2)

Geometric sequences (11.3)

Geometric Series (11.4)

Recursion and special sequences (11.6)

The Binomial Theorem (11.7)

Teaching Unit: *Introduction to Trigonometry*

Essential Understandings

Right triangle trigonometry (13-1) [see page 756-E]
Trigonometric Functions of General Angles (13-3) "
Law of Sines (13-4) [see page 756-F]
Law of Cosines (13-5) "
Circular Functions (13-6) "
Inverse Trigonometric Functions (13-7) "
Graphing Trigonometric Functions (14-1) [see page 820-E]
Trigonometric Identities (14-3) [see page 820-F]
Sum and Difference Angle Formulas (14-5) "
Double and Half-Angle Formulas (14-6) "
Solving Trigonometric Equations (14-7) "
Inverse Trigonometric Functions (13-7) "

Sub Topic:

Knowledge and Skills

Find values of trig functions for acute angles. Solve problems involving right triangles.

Change radian measure to degree measure and vice-versa.

Find values of trig functions for general angles. Use reference angles to find values of trig functions.

Solve problems using Law of Sines. Determine whether a triangle has one, two, or no solutions.

Solve problems using Law of Cosines. Determine whether a triangle can be solved by first using the Law of Sines or the Law of Cosines.

Define and use trig functions based on a unit circle.

Solve equations by using inverse trig functions.

Graph trigonometric functions.

Find the amplitude and period of variation of the sine, cosine, and tangent functions.

Use identities to find trig values, and simplify expressions.

Find values of sine and cosine involving sum and difference formulas. Verify identities by using sum and difference formulas.

Find the values of sine and cosine involving double angle formulas. Find the values of sine and cosine involving half angle formulas.

Solve trig equations. Use trig equations to solve real world problems.
