# Algebra I (2016)

Wright City R-II
Mathematics
Grades 8 - 9, Duration 1 Year, 1 Credit
Required Course

## Course Description

Algebra 1 introduces basic algebraic skills in a logical order, including relations, functions, graphing, systems of equations, radicals, factoring polynomials, rational equations, probability and statistics, and quadratic functions. It emphasizes practical methods of solving first- and second-degree equations and inequalities. Each chapter includes word problems and real-life applications using technology. The course also provides a biblical rationale for the study of mathematics.

## Scope and Sequence

| Timeframe | Unit | Instructional Topics |
|---|---|---|
| 14 Day(s) | Foundations for Algebra | 1. Variables and expressions<br>2. Order of operations and evaluating expressions<br>3. Real numbers and the number line<br>4. Properties of real numbers<br>5. multiplying and dividing real numbers<br>6. Adding and Subtracting real numnbers<br>7. The distributive property<br>8. Introduction to equations |
| 20 Day(s) | Equations | 1. One step equations<br>2. Two-step equations<br>3. Multi Step equations<br>4. Literal equaitons<br>5. Ratio, rates, and conversions<br>6. Percent change<br>7. Real world problems and solving equations |
| 12 Day(s) | Inequalities | 1. Domain and Range of a Function<br>2. One step inequalities<br>3. Multi-step inequalities<br>4. Compound Inequalities<br>5. absolute value equations<br>6. Absolute value inequalities |
| 20 Day(s) | linear functions and graphing | 1. identifying key features of graphs and tables of linear functions.<br>2. function vs. Linear function<br>3. slope<br>4. Graphing linear function with a table<br>5. Graphing linear functions using Slope intercept form<br>6. Point slope form<br>7. Graphing Standard form<br>8. Parallel and Perpendicular line<br>9. Graphing linear inequalities<br>10. Scatter plots and trend lines |
| 18 Day(s) | Systems of equations and inequalities | 1. Solution, No Solution, or Many Solutions<br>2. Solving a system of equations by graphing<br>3. Solving systems of equations by the substitution method<br>4. solving system of equations using the elimination method<br>5. Solving systems in word problems<br>6. Graphing systems of inequalities |
| 15 Day(s) | exponents | 1. Zero and negative exponents<br>2. Multiplying powers with the same base<br>3. power to power rule<br>4. Dividing powers with the same base<br>5. Raising a power to a Quotient<br>6. Scientific notation (adding, subtracting, multiplying, and dividing) |

| | | |
|---|---|---|
| | | 7. Rational numbers as exponents<br>8. exponential Growth and Decay |
| 15 Day(s) | Factoring Polynomials | 1. addinging and subtracting polynomials<br>2. Multiplying polynomials<br>3. Factor monomials from polynomials<br>4. Factoring X^2 +bx +c<br>5. Factoring ax^2+bx+c (grouping)<br>6. factoring special cases<br>7. Find the zeros |
| 15 Day(s) | Quadratics | 1. Graphing parabolas<br>2. Completing the square<br>3. The quadratic formula and the discriminant<br>4. Comparing linear, exponential, and quadratic representations |

### Prerequisites

Set up and solve problems using the correct ORDER OF OPERATIONS. (including proportions, percent and absolute value with rational numbers)

Find the Greatest Common Factor or the Least Common Multiple of a set of whole numbers.

Find additive and multiplicative inverses of rational numbers (integers, fractions, terminating decimals).

Set up and simplify ratios

Use scientific notation

Add, subtract, multiply, divide rational numbers without calculators.

Apply problem solving skills (e.g,. Identifying irrelevant or missing information, making conjectures, extracting mathematical meaning, recognizing and performing multiple steps when needed, verifying results in the context of the problem) to the solution of real-world problems.

Solve multi-step equations including problems with fractions.

Evaluate expressions

Set up and solve one variable inequalities and graph solution on a number line.

Plot points on a coordinate plane.

Be familiar with slope of a line.

### Course Instructional Resources/Textbook

Khan academy

## Course Details

**UNIT: Foundations for Algebra** -- 14 Day(s)

**Unit Description**
Students will use variables to represent quantities and to write algebraic expressions and equations. Students will also master the properties of real numbers that will determine if relationships are always true and use them to rewrite expressions.

**Enduring Understandings/Essential Learner Outcomes**

Students will be able to represent quantities, patterns, and relationships.
Students will begin to see how properties are related to algebra
Students will be able to evaluate algebraic expressions
Students will be able to combine like terms by using the distributive property
Students will be able to sort real numbers into sets

**Academic Vocabulary**
additive inverse
simplify
term
variable
algebraic expression
coefficient
equivalent expressions
evaluate
integers
like terms
order of operations
real numbers

**TOPIC: Variables and expressions** -- 3 Day(s)

**Description**
Student will be able to write algebraic expressions from a verbal phrase and vise versa

Algebra uses symbols to represent quantities that are unknown or that vary. Students can represent mathematical phrases and real-world relationships using symbols and operations.

**Academic Vocabulary (What terms will students need to know?)**
quantity
variable
algebraic expression
numerical expression

**Learning Targets**

I can translate mathematical written phrases into algebraic expressions.

Students will have to find the key mathematical words and write the equivalent meaning to form algebraic expressions.

**Assessment:** This will be assessed to in class activities, warm ups, or weekly quizzess

MA.9-12.A.2.A

I can describe a linear function using graphs, tables and verbal descriptions.

Students will have to create a table of values to describe a linear function. Students will also have to create an equation to represent a verbal description.

MA.A1.IF.B.3

I can add and subtract polynomials with whole number coefficients

MA.A1.APR.A.1

**TOPIC: Order of operations and evaluating expressions** -- 3 Day(s)

**Description**
To simplify expressions involving exponents to use the order of operations to evaluate expressions

**Academic Vocabulary (What terms will students need to know?)**
power
exponent
base
simplify
evaluate

**Learning Targets**

I can name properties and apply them to equations as they are simplified.

MA.A1.APR.A.1

**TOPIC: Real numbers and the number line** -- 2 Day(s)

**Description**
Students will be able to classify, graph and compare real numbers to find and estimate square roots.

**Academic Vocabulary (What terms will students need to know?)**
square root
radicand
radical
perfect square
set
element of a set
subset
rational numbers
natural numbers
whole numbers
integers
irrational numbers
real numbers
inequality

**Learning Targets**

I can use the properties of real numbers to justify the location of each numerical value on a number line.

MA.A1.NQ.A.1

**TOPIC: Properties of real numbers** -- 1 Day(s)

**Description**
Students will identify and use properties of real numbers.

**Academic Vocabulary (What terms will students need to know?)**
equivalent expressions
deductive reasoning
counter examples
associative properties of addition and multiplication
Identity properties
zero property
multiplication property

**Learning Targets**

I can name properties and apply them to equations as they are simplified.

**Assessment:** Students will simplify expressions on white boards and justify each step in the simplification process with mathematical properties

MA.A1.SSE.A.1

**TOPIC: multiplying and dividing real numbers** -- 1 Day(s)

**Description**
Students will be able to find the products and quotients of real numbers

**Academic Vocabulary (What terms will students need to know?)**
multiplicative inverse
reciprocal

**Learning Targets**

I can find the product and the quoient of integers
MA.A1.APR.A.1

**TOPIC: Adding and Subtracting real numnbers** -- 1 Day(s)

**Description**
Students will be able to find the sums and differences of real numbers.

**Academic Vocabulary (What terms will students need to know?)**
absolute value
opposites
additive inverse

**Learning Targets**

I can use the the properties of real numbers to add and subtract integers.
MA.A1.NQ.A.1

**TOPIC: The distributive property** -- 2 Day(s)

**Description**
Students will be able to use the distributive property to simplify expressions.

**Academic Vocabulary (What terms will students need to know?)**
distributive property
term
constant
coefficient
like terms

**Learning Targets**

I can use the distributive property to simplify a mathematical expression.
MA.A1.NQ.B.3

**TOPIC: Introduction to equations** -- 1 Day(s)

**Description**
Students will be able to use an equation to represent the relationship between two quantities that have the same value.

- label if and equation is true, false, or open
- substitution property and then stating if the variable's(s') value(s) are a solution

**Academic Vocabulary (What terms will students need to know?)**
equation
open sentence
solution of an equation
inductive reasoning

**Learning Targets**

I can simplify an equation by using the substitution method for a given variable.
**Assessment:** Students will be given a one variable equation and substitute a numerical value in for the variable to simplify the expression on white boards.
MA.A1.REI.A.1

**UNIT: Equations** -- 20 Day(s)

**Unit Description**
Students will be able to manipulate equations and expressions containing a single variable. Students will be able to justify the problem solving process by proving properties of real numbers.

**Enduring Understandings/Essential Learner Outcomes**
Student will distinguish between an algebraic expression and equation
Student will translate verbal phrases to algebraic expressions and equations
Students will solve equations in one variable including fractional expressions
Students will solve word problems requiring writing and solving equations
Students will solve literal equations for a given variable
Students will justify solutions to equations.

**Academic Vocabulary**
Inverse operations
reciprocal
Percent change

**TOPIC: One step equations** -- 1 Day(s)

**Description**
You will only need to perform one step in order to solve the equation. Onegoal in solving an equation is to have only variables on one side of the equal sign and numbers on the other side of the equal sign.

**Academic Vocabulary (What terms will students need to know?)**
Inverse operations
reciprocal

**Learning Targets**

I can use the properties of equality and inverse operations to solve one step equations by isolating the variable.
MA.A1.CED.A.1

**TOPIC: Two-step equations** -- 2 Day(s)

**Description**
One goal in solving an equation is to have only variables on one side of the equal sign and numbers on the other side of the equal sign. The other goal is to have the number in front of the variable equal to one. The variable does not always have to be x. These equations can make use of any letter as a variable.

The strategy for getting the variable by itself with a coefficient of 1 involves using opposite operations. For example, to move something that is added to the otherside of the equation, you should subtract. The most important thing to remember in solving a linear equation is that whatever you do to one side of the equation, you MUST do to the other side. So if you subtract a number from one side, you MUST subtract the same value from the other side. You will see how this works in the examples.

In solving two-step equations you will make use of the same techniques used in solving one-step equation only you will perform two operations rather than just one.

**Academic Vocabulary (What terms will students need to know?)**
Inverse operation
reciprocal
coefficient
like terms

**Learning Targets**

Students will be able to solve two step equations using inverse operations to isolate the variable. (reversed PEMDAS)
MA.A1.REI.A.1

**TOPIC: Multi Step equations** -- 4 Day(s)

**Description**
Just as with solving one-step or two-step or any equation, one goal in solving an equation is to have only variables on one side of the equal sign and numbers on the other side of the equal sign. The other goal is to have the number in front of the variable equal to one. Keep in mind that the variable does not always have to be x. These equations can make use of any letter as a variable.

The strategy for getting the variable by itself with a coefficient of 1 involves using opposite operations. For example, to move something that is added to the otherside of the equation, you should subtract. The most important thing to remember in solving a linear equation is that whatever you do to one side of the equation, you MUST do to the other side. So if you subtract a number from one side, you MUST subtract the same value from the other side. You will see how this works in the examples.

**Academic Vocabulary (What terms will students need to know?)**
Inverse operations
coefficients
like terms

**Learning Targets**

I can solve multi-step equations by combining like terms.
MA.A1.CED.A.1

I can solve multi step equations with variables on both sides by combining like terms and using properties of equality.
MA.A1.CED.A.1

**TOPIC: Literal equaitons** -- 3 Day(s)

**Description**
A literal equation is an equation where variables represent known values. Literal equations allow use to represent things like distance, time, interest, and slope as variables in an equation.

**Academic Vocabulary (What terms will students need to know?)**
Literal equations
inverse operations

**Learning Targets**

I can write and use literal equations with multiple variables to solve for a specific variable.
MA.A1.CED.A.4

**TOPIC: Ratio, rates, and conversions** -- 2 Day(s)

**Description**
Students will have to convert units of measure in the given data to solve equations.
Students will have to set of proportion equations to solve equations.

**Learning Targets**

I can convert units of measure to solve an equation.
MA.A1.NQ.B.3

I can set up proportions to solve percent problems. ( mark up, mark down, and tax)
MA.A1.NQ.B.3

**TOPIC: Percent change** -- 1 Day(s)

**Description**
Students will be able to find percent increase or decrease from two given data points.

**Learning Targets**

I can find percent change from the given data.
MA.A1.NQ.B.3

**TOPIC: Multi-step inequalities** -- 3 Day(s)

**Description**
Students will be able to manipulate the inequalities and then be able to express the solution set on a number line and in interval notation.

**Learning Targets**

I can annotate text to create an equation.
MA.A1.CED.A.1

I can justify each simplification step taken to solve an equation.
MA.A1.REI.A.1

I can determine the correct unit of measure to label a solution.
MA.A1.NQ.B.5

**UNIT: Inequalities** -- 12 Day(s)

**Unit Description**
Students will be able to manipulate inequalities and be able to express the range of solutions in multiple ways. (number line and interval notation)

**Enduring Understandings/Essential Learner Outcomes**
Students will be able to manipulate inequalities and be able to express the range of solutions in multiple ways. (number line and interval notation)
_ Students will be able to complete this up able with multiple levels of inequalites

**Academic Vocabulary**
inequality
absolute value
interval notation

**TOPIC: Domain and Range of a Function** -- 1 Day(s)

**Description**
Students will determine what will make up the term function.

**Learning Targets**

I can label the domain and range of a given data set.
MA.A1.IF.A.1

I can determine if a graphed figure is a function.
MA.A1.IF.A.1

**TOPIC: One step inequalities** -- 1 Day(s)

**Description**
Students will solve one step inequalities and then express the solution set on a number line and as a interval notation.

**Academic Vocabulary (What terms will students need to know?)**
Inverse operations

**Learning Targets**

Students will be able to manipulate inequalities and express the solution set on a number line.
MA.A1.CED.A.1

I can solve a multi step inequality and model my solution on a number line and in function notation.
MA.A1.IF.A.2

**TOPIC: Multi-step inequalities** -- 3 Day(s)

**Description**
Students will be able to manipulate the inequalities and then be able to express the solution set on a number line and in interval notation.

**Learning Targets**

I can represent my inequality's solution in function notation.
MA.A1.IF.A.2

Students will be able to manipulate inequalities and be able to express the range of solutions in multiple ways. (number line and interval notation)
MA.A1.CED.A.1

**TOPIC: Compound Inequalities** -- 3 Day(s)

**Description**
A compound inequality is a sentence with two inequality statements joined either by the word “or” or by the word “and.” “And” indicates that both statements of the compound sentence are true at the same time. It is the overlap or intersection of the solution sets for the individual statements. “Or” indicates that, as long as either statement is true, the entire compound sentence is true. It is the combination or union of the solution sets for the individual statements. A compound inequality that uses the word “and” is known as a conjunction. Although “and” and “or” are parts of speech known as conjunctions, the mathematical conjunction has a different meaning from the grammatical one. To prove the point, the conjunction (part of speech) “or”—when used in a compound inequality—forms what is known as a disjunction. Just remember “con” means “with another,” and “dis” means “one OR the other.”

**Academic Vocabulary (What terms will students need to know?)**
Compound inequality
Conjunction
Disjuction
True statements
False statements

**Learning Targets**

I can solve a multi step inequality and model my solution on a number line and in function notation.
MA.A1.REI.A.1

**TOPIC: absolute value equations** -- 2 Day(s)

**Description**
The absolute number of a number a is written as

|a||a|

And represents the distance between a and 0 on a number line.
An absolute value equation is an equation that contains an absolute value expression. The equation

|x|=a|x|=a

Has two solutions x = a and x = -a because both numbers are at the distance a from 0.

**Academic Vocabulary (What terms will students need to know?)**
Absolute value equation

**Learning Targets**

Students will solve absolute value functions to represent distance from the origin.
MA.A1.CED.A.1 MA.A1.CED.A.3

**TOPIC: Absolute value inequalities** -- 1 Day(s)

**Description**
When solving absolute value inequalities, there are two cases to consider. Case 1 : The expression inside the absolute value symbols is positive. Case 2 : The expression inside the absolute value symbols is negative.

**Academic Vocabulary (What terms will students need to know?)**
Absolute value
distance
number line
solution set
function notation

**Learning Targets**

I can determine the domain and range of the function.
MA.A1.IF.B.4

Students will be able to manipulate inequalities and express the solution set on a number line.
MA.A1.CED.A.1

Students will solve absolute value functions to represent distance from the origin.
MA.A1.CED.A.1 MA.A1.CED.A.3

**UNIT: linear functions and graphing** -- 20 Day(s)

**Unit Description**
Brief Summary of Unit: Students will learn to graph linear functions given different representations of linear relationships (table, equation, arithmetic sequence, etc.). Students will also analyze linear functions, given multiple representations, to identify and use key features of linear functions and how they relate to real world contexts.

**Enduring Understandings/Essential Learner Outcomes**
Students will consider…
● Which equation would best model a real life situation?
● Which linear function best represents a situation?
● What function model (equation, table or graph) best represents a situation?
● Which key feature(s) will best help interpret a problem?
● How can functions be compared if they are in different formats?

● When would technology be useful in comparing functions?
● How are arithmetic sequences similar to and different from linear function?
● What type of real world situations can be modeled with arithmetic sequences?
● What is the best way to tell if a relation is proportional or non-proportional?
● What real world situations can be modeled with direct variation?
● How can a rate of change/slope be determined for a linear function?
● What's the significance of the rate of change for a function?

**Academic Vocabulary**
linear function
domain and range
rate of change
slope
y intercept
coordinate plane
proportional
slope intercept form
standard form

**TOPIC: identifying key features of graphs and tables of linear functions.** -- 1 Day(s)

**Description**
Students with have to label and discuss meaning of key features of graphs and tables of linear functions.

**Academic Vocabulary (What terms will students need to know?)**
x intercept
y intercept
coordinate plane
unit rate/slope

**Learning Targets**

I can identify and interpret key features of the graph or table.
MA.A1.IF.C.7

**TOPIC: function vs. Linear function** -- 1 Day(s)

**Description**
Students will determine the differences in a non function vs. function and a function vs. linear function.

**Academic Vocabulary (What terms will students need to know?)**
domain
range
linear

**Learning Targets**

I can determine is the given data represents a function.
MA.A1.IF.A.1

**TOPIC: slope** -- 2 Day(s)

**Description**
I will be able to calculate the rate of change or slope of a linear function using ordered pairs, tables of values and graphs.
Acquisition: Knowledge / Skill

**Academic Vocabulary (What terms will students need to know?)**
slope
rate of change
linear functions

**Learning Targets**

I can find slope from any two given data points.
MA.A1.DS.A.6

I can determine the average rate of change of linear function.
MA.A1.IF.B.5

**TOPIC: Graphing linear function with a table** -- 1 Day(s)

**Description**
Student will be able to graph linear functions using a t-table

**Academic Vocabulary (What terms will students need to know?)**
t-table
substitution

**Learning Targets**

I can graph a linear functions using a t-table.
MA.A1.CED.A.2

I can place data from a graph into a two frequency table.
MA.A1.IF.B.3

I can interpret graphical data and place into a two way frequency table/
MA.A1.DS.A.1

**TOPIC: Graphing linear functions using Slope intercept form** -- 3 Day(s)

**Description**
The slope-intercept form is simply the way of writing the equation of a line so that the slope (steepness) and y-intercept (where the line crosses the vertical y-axis) are immediately apparent. Often, this form is called y = mx + b form.

**Academic Vocabulary (What terms will students need to know?)**
Slope
y intercept
x intercept
domain
range
two way frequency table

**Learning Targets**

I can solve the literal equation to fit the slope intercept form.
MA.A1.CED.A.4

I can create and graph linear functions from the given data using slope intercept form.
MA.A1.CED.A.2

I can interpret the data from the two way frequency tables to create and graph a linear function in slope intercept form.
MA.A1.DS.A.4

I can label slope and the y intercept of a graphed linear function.
MA.A1.DS.A.6

Using graphs, tables and verbal descriptions I can describe the linear function.
MA.A1.IF.B.3

I can determine the domain and range of the function.
MA.A1.IF.B.4

I can create a linear equation in from two given ordered pairs ( data points)
MA.A1.IF.B.5

**TOPIC: Point slope form** -- 3 Day(s)

**Description**
the equation of a straight line in the form y − y1 = m(x − x1) where m is the slope of the line and (x1, y1) are the coordinates of a given point on the line — compare slope-intercept form.

**Academic Vocabulary (What terms will students need to know?)**
Ordered pair
slope
x intercept
y intercept

**Learning Targets**

I can determine the average rate of change of linear function.
MA.A1.IF.B.5

I can determine the domain and range of the function.
MA.A1.IF.B.4

I can identify and interpret key features of the graph or table.
MA.A1.IF.C.7

Using graphs, tables and verbal descriptions I can describe the linear function.
MA.A1.IF.B.3

I can graph and write a linear function in point slope form.
MA.A1.CED.A.2

I can compare the same linear function graphed using two different methods.
MA.A1.LQE.A.3

I can graph the x and y intercepts of a linear function.
MA.A1.CED.A.2

**TOPIC: Graphing Standard form** -- 2 Day(s)

**Description**
Graphing the zeros of the linear function, meaning graphing the x and y intercepts.

**Academic Vocabulary (What terms will students need to know?)**
zeros
x intercept
y intercept
slope

**Learning Targets**

I can describe a linear function using graphs, tables and verbal descriptions.

Students will have to create a table of values to describe a linear function. Students will also have to create an equation to represent a verbal description.

MA.A1.IF.B.3

I can determine the domain and range of the function.

MA.A1.IF.B.4

I can identify and interpret key features of the graph or table.

MA.A1.IF.C.7

I can interpret the rate of change of a graphed linear function.

MA.A1.IF.B.5

I can find the intercepts of a linear function.

MA.A1.REI.C.7

I can write equations for perpendicular lines given two data points.

MA.A1.REI.C.7

**TOPIC: Parallel and Perpendicular line** -- 2 Day(s)

**Description**
The form that is most useful for us in finding whether two linear equations are parallel or perpendicular is the slope-intercept form, which is y = mx + b. ... If they are negative reciprocals of each other, then the lines are perpendicular.

**Academic Vocabulary (What terms will students need to know?)**
inversed reciprocal
slope
y intercept
slope intercept form
point slope form

**Learning Targets**

I can graph parallel lines.

MA.A1.CED.A.2

I can write equations for parallel lines given two data points.

MA.A1.CED.A.2

I can graph perpendicular lines

MA.A1.CED.A.2

I can write equations for perpendicular lines given two data points.

MA.A1.CED.A.2

**TOPIC: Graphing linear inequalities** -- 2 Day(s)

**Description**
Graphing inequalities on either a number line or in the coordinate plane (with x and y axes) helps to visually represent several forms of inequalities: The graph of a linear inequality produces a region on the coordinate plane with a boundary line.

**Academic Vocabulary (What terms will students need to know?)**
boundary line
dashed line
solid line
slope
y intercept

**Learning Targets**

I and create and graph linear inequalities on the coordinate plane.
MA.A1.CED.A.2

I can determine if a given data point is a solution to the linear inequality by evaluating the graphed function or by using the substitution method.
MA.A1.CED.A.3

I can rearrange the linear inequality to slope intercept form.
MA.A1.CED.A.4

**TOPIC: Scatter plots and trend lines** -- 3 Day(s)

**Description**
SCATTER PLOT – a graph that shows a relationship between two sets of data
CORRELATION – a relationship between two sets of data
TREND LINE – a line that closely fits the data in a scatter plot

**Academic Vocabulary (What terms will students need to know?)**
Scatter plot
correlation
trend line
residual
slope
y intercept
slope intercept form

**Learning Targets**

I can determine the positivity or negativity of the correlation between the two data sets.
MA.A1.DS.A.2

I can determine future data points from trend line drawn in the scatter plot.
MA.A1.DS.A.4

I can construct a scatter plots from two different data sets.
MA.A1.DS.A.5

I can construct a trend line for the data in a scatter plot.
MA.A1.DS.A.5

I can find the residual between the trend line equation and a given data point.
MA.A1.DS.A.5

I can determine if the data is a linear correlation.
MA.A1.DS.A.7

I can distinguish between correlation and causation in the data sets
MA.A1.DS.A.8

I can predict future data points by evaluating and summarize the current data and correlation.
MA.A1.DS.A.3

I can determine the outliers in the data sets
MA.A1.DS.A.3

**UNIT: Systems of equations and inequalities** -- 18 Day(s)

**Unit Description**
This unit extends the skills learned from plotting and analyzing individual equations and inequalities into working with linear systems. Students will learn three techniques for solving these systems—graphing, substitution, and elimination. They'll also see how to use these methods to analyze application problems.

**Enduring Understandings/Essential Learner Outcomes**
Solve a system of linear equations by graphing.
Determine whether a system of linear equations is consistent or inconsistent.
Determine whether a system of linear equations is dependent or independent.
Determine whether an ordered pair is a solution of a system of equations.
Solve application problems by graphing a system of equations.
Solve a system of linear inequalities by graphing.
Determine whether an ordered pair is a solution of a system of inequalities.
Solve application problems by graphing a system of inequalities.
Solve a system of equations using the substitution method.
Recognize systems of equations that have no solution or an infinite number of

solutions.
Solve application problems using the substitution method.
Solve a system of equations when no multiplication is necessary to eliminate a variable.
Solve a system of equations when multiplication is necessary to eliminate a variable.
Solve application problems using the elimination method.

**Academic Vocabulary**
no solution
solution
ordered pairs
graphing method
substitution method
elimination method

**TOPIC: Solution, No Solution, or Many Solutions** -- 1 Day(s)

**Description**
Students will determine if a system has one solution, no solution, or many solutions but imputing the ordered pair(s) to the system of equations.

**Academic Vocabulary (What terms will students need to know?)**
solution
systems

**Learning Targets**

I can determine if the data point is a solution to the system of equations.
MA.A1.CED.A.3

**TOPIC: Solving a system of equations by graphing** -- 2 Day(s)

**Description**
To solve a system of linear equations graphically we graph both equations in the same coordinate system. The solution to the system will be in the point where the two lines intersect.

**Academic Vocabulary (What terms will students need to know?)**
ordered pair
coordinate plane
slope
y intercept
slope intercept form

**Learning Targets**

I can solve a system of equations through graphing each linear function on a coordinate plane.
MA.A1.REI.B.3

I can write the two linear equations to would represent a given solution on a the coordinate plane.
MA.A1.REI.B.4

I can determine the solution(s) of system main up of linear, exponential, and quadratic functions
MA.A1.REI.C.6

**TOPIC: Solving systems of equations by the substitution method** -- 3 Day(s)

**Description**
Substitution Method. One way to solve systems of equations is by substitution. In this method, solve an equation for one variable, then substitute that solution in the other equation, and solve.

**Academic Vocabulary (What terms will students need to know?)**
variable
substitution
solution
no solution
many solutions

**Learning Targets**

I can solve systems of equations using the substitution method.
MA.A1.REI.B.3

I can write to two different systems of equations that will produce the same solution.
MA.A1.REI.B.5

**TOPIC: solving system of equations using the elimination method** -- 2 Day(s)

**Description**
In the elimination method you either add or subtract the equations to get an equation in one variable.

**Academic Vocabulary (What terms will students need to know?)**
multiples
solution

**Learning Targets**

I can solve system of equations using the elimination method.
MA.A1.REI.B.4

**TOPIC: Solving systems in word problems** -- 3 Day(s)

**Description**
Students will be able to annotate text to then create a system of equation to solve.

**Academic Vocabulary (What terms will students need to know?)**
annotate

**Learning Targets**

I can create and solve system of equation word problems.
MA.A1.CED.A.2

I can interpret text to determine the constraints of the system equations.
I can determine if the given ordered pair is a solution to verbal written system.
MA.A1.CED.A.3

I can represent the solution to the system in three different ways.
MA.A1.IF.C.9

**TOPIC: Multiplying powers with the same base** -- 1 Day(s)

**Description**
All the numbers are in powers of base 10. Students will learn a method for multiplying powers that have the same base.

**Learning Targets**

I can graph systems of inequalites.
MA.A1.CED.A.2

I can determine if an ordered pair falls with a solution set of a system of inequalities.
MA.A1.CED.A.3

I can solve and graph a system of linear inequalities
MA.A1.REI.C.8

**UNIT: exponents** -- 15 Day(s)

**Unit Description**
This unit extends knowledge of numerical and algebraic expressions and equations from previous grades, and it develops understanding of properties of integer exponents, square and cube roots, integer powers of 10, and scientific notation in authentic situations.

**Enduring Understandings/Essential Learner Outcomes**
Properties of integer exponents can be used to generate equivalent numerical expressions.
Just as numbers can be squared, cubed, and raised to the nth power, the root values (i.e., square root, cube root, nth root, etc.) of numbers can be determined or approximated.
The square roots of rational numbers are not always rational, but are sometimes irrational.
Numbers with very small or very great values can be expressed concisely using scientific notation.

**Academic Vocabulary**
radical
square root
radicad
power
exponent
base
coefficient
cube root

**TOPIC: Zero and negative exponents** -- 1 Day(s)

**Description**
Students will simplify expressions involving zero and negative exponents.

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: Multiplying powers with the same base** -- 1 Day(s)

**Description**
All the numbers are in powers of base 10. Students will learn a method for multiplying powers that have the same base.

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: power to power rule** -- 1 Day(s)

**Description**
Students will learn to use properties of exponents to simplify a power raised to power or a proroduct raised to a power

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: Dividing powers with the same base** -- 1 Day(s)

**Description**
It is represented with repeated multiplication to simplify quotients of powers with the same base. Expand the numerator and the denominator. Then divide out the common factors.

**Academic Vocabulary (What terms will students need to know?)**
base
exponent

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: Raising a power to a Quotient** -- 4 Day(s)

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: Scientific notation (adding, subtracting, multiplying, and dividing)** -- 3 Day(s)

**Description**
A method of writing or displaying numbers in terms of a decimal number between 1 and 10 multiplied by a power of 10.

**Learning Targets**

I can simplify exponent functions using exponent laws
MA.A1.NQ.A.1

**TOPIC: Rational numbers as exponents** -- 2 Day(s)

**Description**
A rational exponent represents both an integer exponent and an nth root. The root is found in the denominator (like a tree, the root is at the bottom), and the integer exponent is found in the numerator.

**Academic Vocabulary (What terms will students need to know?)**
Numerator
Denominator
radical
root

**Learning Targets**

I can find the exponential growth or decay of a exponential function
MA.A1.NQ.A.2

**TOPIC: Multiplying polynomials** -- 1 Day(s)

**Description**
Step 1: Distribute each term of the first polynomial to every term of the second polynomial. Remember that when you multiply two terms together you must multiply the coefficient (numbers) and add the exponents.

**Learning Targets**

I can find the exponential growth or decay of a exponential function
MA.A1.LQE.A.1

**UNIT: Factoring Polynomials** -- 15 Day(s)

**Unit Description**
This unit builds upon students' knowledge of polynomials learned in the previous unit. They will learn how to use the distributive property and greatest common factors to find the factored form of binomials and how to factor trinomials by grouping. Students will also learn how to recognize and quickly factor special products (perfect square trinomials, difference of squares, and the sum and difference of two squares). Finally, they'll get experience combining these techniques and using them to solve quadratic equations.

**Enduring Understandings/Essential Learner Outcomes**
Factor trinomials with a leading coefficient of 1.
Factor trinomials with a common factor.
Factor trinomials with a leading coefficient other than 1.
Factor trinomials that are perfect squares.
Factor binomials in the form of the difference of squares
Solve equations in factored form by using the Principle of Zero Products.
Solve quadratic equations by factoring and then using the Principle of Zero Products.

**Academic Vocabulary**
monomial
binomial
polynomial
greatest common factor
factor
zeros

**TOPIC: addinging and subtracting polynomials** -- 1 Day(s)

**Description**
Combining like to terms to simplify the polynomial expression

**Learning Targets**

I can factor the special cases of polynomials
MA.A1.APR.A.1

**TOPIC: Multiplying polynomials** -- 1 Day(s)

**Description**
Step 1: Distribute each term of the first polynomial to every term of the second polynomial. Remember that when you multiply two terms together you must multiply the coefficient (numbers) and add the exponents.

**Learning Targets**

I can multiply polynomials together
MA.A1.APR.A.1

**TOPIC: Factor monomials from polynomials** -- 1 Day(s)

**Description**
pulling the GCF from the polynomials sentence.

**Learning Targets**

I can factor out the monomial (GCF) from the polynomials sentence.
MA.A1.APR.A.2

I can divide a polynomial by a monomial
MA.A1.APR.A.2

**TOPIC: Factoring X^2 +bx +c** -- 2 Day(s)

**Description**
Factoring polynomials involves breaking up a polynomial into simpler terms (the factors) such that when the terms are multiplied together they equal the original polynomial. ... Factoring polynomials includes: Finding the greatest common factor. Grouping like terms.

**Learning Targets**

I can factor X^2+bx+c to condensed smaller terms.
MA.A1.SSE.A.2

**TOPIC: Factoring ax^2+bx+c (grouping)** -- 3 Day(s)

**Description**
Factoring polynomials involves breaking up a polynomial into simpler terms (the factors) such that when the terms are multiplied together they equal the original polynomial. ... Factoring polynomials includes: Finding the greatest common factor. Grouping like terms.

**Learning Targets**

I can factor ax^2+bx+c to an equivalent sentence broken into smaller terms
MA.A1.BF.A.1

**TOPIC: factoring special cases** -- 2 Day(s)

**Description**
Factoring perfect squares and the Difference of squares

**Academic Vocabulary (What terms will students need to know?)**
Perfect square
Difference

**Learning Targets**

I can solve the quadratic equations by factoring to find the root(zeros) of the function
MA.A1.APR.A.2

**TOPIC: Graphing parabolas** -- 5 Day(s)

**Description**
All parabolas are vaguely “U” shaped and they will have a highest or lowest point that is called the vertex.Parabolas may open up or down and may or may not have x-intercepts and they will always have a single y-intercept.

**Academic Vocabulary (What terms will students need to know?)**
quadratic function
axis of symmetry
vertx
minimum

**Learning Targets**

I can solve the quadratic equations by factoring to find the root(zeros) of the function
MA.A1.SSE.A.3

**UNIT: Quadratics** -- 15 Day(s)

**Unit Description**
In some situations, quadratic functions can be used to model non-linear problems. Depending on the situation, quadratic equations may be solved in different ways. For example, a problem involving physical motion may be solved by graphing, allowing the situation to be visualized. However, when solutions cannot be determined from a graph, another method, such as using the Quadratic Formula, may be appropriate. There are also situations that may be modeled by functions that are neither linear nor quadratic. Exponential functions may be used to describe changes in population growth, to solve compound interest problems, and to model other situations that display exponential behavior. The lessons in this unit introduce students to quadratic and exponential functions.

**Enduring Understandings/Essential Learner Outcomes**
Graphing quadratic equations.
Solving quadratic equations by graphing.
Transformations of quadratic functions.
Solving quadratic equations by completing the square.
Solving quadratic equations by using the Quadratic Formula.
Analyzing functions with successive differences.

**Academic Vocabulary**
Quadratic function
standard form of a quadratic function
quadratic parent function
parabola
axis of symmetry
vertex
minimum
maximum

**TOPIC: Graphing parabolas** -- 5 Day(s)

**Description**
All parabolas are vaguely “U” shaped and they will have a highest or lowest point that is called the vertex.Parabolas may open up or down and may or may not have x-intercepts and they will always have a single y-intercept.

**Academic Vocabulary (What terms will students need to know?)**
quadratic function
axis of symmetry
vertx
minimum
maximum

**Learning Targets**

I can graph a quadratic function
MA.A1.CED.A.2

I can find the axis of symmetry of a quadratic function
MA.A1.CED.A.2

I can solve to find the vertex of a quadratic function
MA.A1.CED.A.2

I can determine the domain and range of a graphed quadratic function
MA.A1.IF.B.4

I can find the maximum and minimum of a quadratic function,
MA.A1.SSE.A.3

**TOPIC: Completing the square** -- 3 Day(s)

**Description**
a technique used to solve quadratic equations, graph quadratic functions, and evaluate integrals. This technique can be used when factoring a quadratic equation does not work or to find irrational and complex roots.

**Academic Vocabulary (What terms will students need to know?)**
completing the square

**Learning Targets**

I can solve quadratic equations by completing the square
MA.A1.REI.A.2

**TOPIC: The quadratic formula and the discriminant** -- 2 Day(s)

**Description**
The general form of a quadratic equation is , where x represents a variable, and a, b, and c are constants, with . A quadratic equation has two solutions, called roots.

**Academic Vocabulary (What terms will students need to know?)**
Quadratic formula
discriminant

**Learning Targets**

I can find the root of a quadratic function using the quadratic formula.
MA.A1.REI.A.2

**TOPIC: Comparing linear, exponential, and quadratic representations** -- 3 Day(s)

**Description**
Students will discovery to algebraic and graphical differences between linear, exponential, and quadratic functions.

**Academic Vocabulary (What terms will students need to know?)**
first difference
second difference.

**Learning Targets**

I can describe the visual differences between linear, exponential, and quadratic graphical representations.
MA.A1.IF.C.7

I can label of function linear, exponential, or quadratic from the given data.
MA.A1.IF.C.9

I can interpret the parameters of a function and determine if the function is linear, exponential, or quadratic.
MA.A1.IF.B.6

I can view two equivalent forms of functions and determine to properties of the function.
MA.A1.IF.C.8

I can use tables and graphs to describe a linear, exponential, and a quadratic function.
MA.A1.LQE.A.2

I can find the arithmetic or geometric sequence of a given function.
MA.A1.LQE.B.4

I can find the future domain values for both arithmetic and geometric sequences
MA.A1.LQE.B.5

I can find the next term in the sequence by creating an equation to represent the function data.
MA.A1.LQE.B.6