# Algebra 1.5 Standards Curriculum Map

**Bourbon County Schools**

**Level:**

**Grade and/or Course:**

**Updated:**

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<th>Days</th>
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<tr>
<td>1-19</td>
<td>Unit 1</td>
<td>A.SSE.1 Interpret expressions that represent a quantity in terms of its context. a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret ( P(1+r)^n ) as the product of ( P ) and a factor not depending on ( P ).</td>
<td>ACT Bellringers LTF Activities</td>
<td>I can simplify expressions using addition, subtraction, multiplication and division. I can translate real-world problems into expressions using variables. I can apply properties to simplify algebraic expressions. I can use terminology associated with the Cartesian Plan. I can interpret data from all types of graphs to draw inferences and make predictions. I can identify arithmetic sequences and patterns. I can identify the most efficient way to display data.</td>
<td>Order of Operation Commutative Associative Distributive Property Inverse Substitution x-axis y-axis Origin Coordinate Line Graph Bar Graph Circle Graph Histogram Scatterplot Box-and-Whisker Plot Stem-and-Leaf Plot Frequency Tables Sequence Data</td>
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For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \in \mathbb{N}$. F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.

S.I.D.1 Represent data with plots on the real number line (dot plots, histograms, and box plots).
S.I.D.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
S.I.D.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
S.I.D.5 Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.
S.I.D.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
  a. Fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear and exponential models.
  b. Informally assess the fit of a function by plotting and analyzing residuals.
  c. Fit a linear function for a scatter plot that suggests a linear association.
A.SSE.1 Interpret expressions that represent a quantity in terms of its context.
  a. Interpret parts of an expression, such as terms, factors, and coefficients.
  b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret $P(1+r)^n$ as the product of $P$ and a factor not depending on $P$. 

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<th>Days</th>
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<th>Learning Targets (&quot;I Can&quot; Statements)</th>
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| 20-37 | Unit 2 You've Got Problems? Algebra's Got Solutions | A.CED.4: Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm's law $V = IR$ to highlight resistance $R$. *Instructional*  
A.CED.1: Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.  
A.REI.3: Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.  
A.REI.1: Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.  
A.CED.1: Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. | ACT Bellringers  
Common assessment  
LTF Activities | I can solve single-step and multi-step equations and inequalities.  
I can solve equations that contain absolute value.  
I can solve formulas for a specified variable.  
I can graph linear inequalities.  
I can identify the effects of the central tendency. | Equations  
Variable  
Absolute Value  
Inequality  
Linear  
Mean  
Median  
Mode  
Range |
| 38-53 | Unit 3 The Three R's: Rise, Run and Regression | A.CED.2: Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.  
A.REI.10: Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).  
F.IF.6: Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph. ●  
F.IF.7: Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. ●  
F.LE.1: Distinguish between situations that can be modeled | ACT Bellringers  
LTF Activities | I can write and graph linear equations and inequalities from real-world problems.  
I can write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the equation.  
I can identify, formulate, and obtain solutions to problems involving direct and inverse variation.  
I can give the domain. | Slope  
Rate of Change  
Rise over run  
Y-intercept  
X-intercept  
Range  
Domain  
Slope Intercept form  
Point Slope form  
Standard form  
Direct and inverse variation  
Cartesian Plane |
with linear functions and with exponential functions.

a. Prove that linear functions grow by equal differences over equal intervals; and that exponential functions grow by equal factors over equal intervals.

b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.

c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.  

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

F.BF.1 Write a function that describes a relationship between two quantities.

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

b. Combine standard function types using arithmetic operations. For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.

S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

S.ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

S.ID.9 Distinguish between correlation and causation.

and range of relations and functions
I can identify graphs of relations and functions and analyze them to determine whether a relation is a function (e.g., vertical line test)

I can Use the terminology associated with the Cartesian plane in describing points and lines
I can recognize the concept of slope as a rate of change and determine the slope when given the equation of a line in standard form or slope-intercept form, the graph of a line, two points, or a verbal description
I can graph a linear equation using a table of values, x- and y-intercepts, slope-intercept form, and technology
I can translate between different representations of relations and functions: graphs, equations, sets of ordered pairs, verbal descriptions, and tables
I can identify an approximate line of best
F.IF.6 Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.

- Graph linear and quadratic functions and show intercepts, maxima, and minima.
- Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. For example, if the function h(n) gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.

Fit to model data and make predictions.

Relations, Probability, and Statistics

I can identify the most efficient way to display data

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<td>54-69</td>
<td>Unit 4 Systems of Linear Equations</td>
<td>A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.</td>
<td>ACT Bellringers LTF Activities</td>
<td>I can solve systems of two equations using various methods, including elimination, substitution, and graphing with and without technology. I can graph linear inequalities with two variables on the standard (x,y) coordinate plane. I can recognize the concept of slope as a rate of change and determine the slope when given the equation of a line in standard form or slope-intercept form, the</td>
<td>Substitution Method Elimination Method Graphing method Intersection Parallel Perpendicular Infinite solutions Relations and functions</td>
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and/or \( g(x) \) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

A.REI.12 Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) assigns to each element of the domain exactly one element of the range. If \( f \) is a function and \( x \) is an element of its domain, then \( f(x) \) denotes the output of \( f \) corresponding to the input \( x \). The graph of \( f \) is the graph of the equation \( y = f(x) \).

A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line \( y = -3x \) and the circle \( x^2 + y^2 = 3 \).

F.IF.4 For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.

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<td>70-87</td>
<td>Unit 5</td>
<td>Beyond the First Degree: Exponents and Polynomials</td>
<td>F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases. e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. F.LE.1 Distinguish between situations that can be modeled</td>
<td>ACT Bellringers</td>
<td>Monomial Binomial Trinomial Degree Exponent Perfect square Polynomial</td>
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<tr>
<td>F.LE.2 Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).</td>
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<td>F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.</td>
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<td>F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.</td>
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**LTF Activities**

- I can use properties of exponents (including zero and negative exponents) to evaluate and simplify expressions.
- I can identify patterns of growth (e.g., patterns of exponential growth) in a set of data.

**Common Assessment #3**

- Polynomials
- Exponential growth and decay
- Linear
- Quadratic
- Cubic

**Laws of exponents**

- Exponential growth and decay
- Linear
- Quadratic
- Cubic
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<td>88-117</td>
<td>Unit 6</td>
<td>F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.</td>
<td>ACT Bellringers</td>
<td>I can translate real-world problems into expressions</td>
<td>Algebraic properties</td>
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<td>Factoring and</td>
<td>F.BF.3 Identify the effect on the graph of replacing ( f(x) ) by ( f(x) + k ), ( k f(x) ), ( f(kx) ), and ( f(x + k) ) for specific values of ( k ) (both positive and negative); find the value of ( k ) given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.</td>
<td>LTF Activities</td>
<td>I can apply algebraic properties (e.g., commutative, associative, distributive, identity, inverse, substitution) to simplify algebraic expressions</td>
<td>Perfect square</td>
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<td>Quadratics</td>
<td>A.SSE.2 Use the structure of an expression to identify ways to rewrite it. For example, see ( x^2 - y^2 ) as ( (x+y)(x-y) ), thus recognizing it as a difference of squares that can be factored as ( (x+y)(x-y) ).</td>
<td>Common Assessment #4</td>
<td>I can evaluate functions at given values</td>
<td>Difference of Squares</td>
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|       |                     | A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.  
   a. Factor a quadratic expression to reveal the zeros of the function it defines.  
   b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. |                       | I can use the terminology associated with the Cartesian plane in describing points and lines | Factor                              |
|       |                     | A.REI.4 Solve quadratic equations in one variable.  
   a. Use the method of completing the square to transform any quadratic equation in \( x \) into an equation of the form \( (x - p)^2 = q \) that has the same solutions. Derive the quadratic formula from this form.  
   b. Solve quadratic equations by inspection (e.g., for \( x^2 = 49 \)), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as \( a \pm bi \) for real numbers \( a \) and \( b \). |                       | I can translate between different representations of relations and functions: graphs, equations, sets of ordered pairs, verbal descriptions, and tables | Zeros                               |
|       |                     | F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum. |                       | I can factor perfect square trinomials and the difference of two squares | Roots                               |
|       |                     |                                                                          |                       | I can factor trinomials in the form \( ax^2 + bx + c \)    | x-intercepts                       |
|       |                     |                                                                          |                       | I can solve quadratic equations using multiple methods, including graphing, factoring, and the square root principle | Standard form of a quadratic       |
|       |                     |                                                                          |                       | I can identify graphs of                                   | Parabola                           |
|       |                     |                                                                          |                       |                                                               | Minimum                            |
|       |                     |                                                                          |                       |                                                               | Maximum                            |
|       |                     |                                                                          |                       |                                                               | Axis of symmetry                   |
|       |                     |                                                                          |                       |                                                               | Discriminate                       |
For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.

F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

a. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context.

b. Use the properties of exponents to interpret expressions for exponential functions. For example, identify percent rate of change in functions such as $y = (1.02)^t$, $y = (0.97)^t$, $y = (1.01)^{12t}$, $y = (1.2)^{10t}$, and classify them as representing exponential growth or decay.

### Days | Unit/Topic | Standards | Activities | Learning Targets (“I Can” Statements) | Vocabulary
---|---|---|---|---|---
118-147 | Unit 7 Radical Expressions and Equations | N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. F.LE.3 Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function. | ACT Bellringers LTF Activities Common Assessment #5 | I can give the domain and range of relations and functions I can identify graphs of relations and functions and analyze them to determine whether a relation is a function (e.g., vertical line test) I can find rational number square roots (without calculators) and approximate irrational square roots (with and without calculators) I can evaluate and simplify radical expressions I can Multiply radical expressions I can simplify an | Radical Rationalize Conjugates Square root function Radical equation Radicand Index root
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<td>148-175</td>
<td>Unit 8</td>
<td>Rational Expressions and Equations</td>
<td>ACT Bellringers</td>
<td>I can evaluate and simplify rational expressions</td>
<td>Asymptote</td>
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<td>N.RN.3 Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.</td>
<td>LTF Activities</td>
<td>I can add, subtract, multiply, and divide rational expressions</td>
<td>Combination</td>
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<td>F.BF.4 Find inverse functions.</td>
<td>Common Assessment #6</td>
<td>I can find the probability of a simple event.</td>
<td>Constant of variation</td>
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<td>a. Solve an equation of the form ( f(x) = c ) for a simple function ( f ) that has an inverse and write an expression for the inverse. *For example,( f(x) = 2x^3 ) or ( f(x) = (x+1)/(x-1) ) for ( x \neq 1 ).</td>
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<td>I can distinguish between independent and dependent events.</td>
<td>Inverse variation</td>
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