Davison Community Schools
Algebra 1

Course Outline

Unit 1: Real Numbers
Unit 2: Analyze and Solve Linear Equations
Unit 3: Use Functions to Model Relationships
Unit 4: Investigate Bivariate Data
Unit 5: Analyze and Solve Systems of Linear Equations
Unit 6: Congruence and Similarity
Unit 7: Understand and Apply the Pythagorean Theorem
Unit 8: Solve Problems Involving Surface Area and Volume

Priority Standards

1-2	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
1-3	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
1-3	Define appropriate quantities for the purpose of descriptive modeling.
1-4	Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
1-4	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.
1-5	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints
1-5	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.
1-5	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
1-6	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.
1-7	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.
1-MM	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
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1-STEM	Define appropriate quantities for the purpose of descriptive modeling.
1-STEM	Write a function that describes a relationship between two quantities.★

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1-STEM	Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

2-0	I can calculate the rate of change (slope), between two points, of a graph, and of a table. I can interpret the slope, and explain the meaning of it in the context of the situation, including using appropriate units for the real-life application.
2-1	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
2-1	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
2-2	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).
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2-3	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints

3-1	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 c
3-2	Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
3-2	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
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3-3	Write a function that describes a relationship between two quantities.★

3-3	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★
3-3	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
3-4	Determine an explicit expression, a recursive process, or steps for calculation from a context.
3-4	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★
3-4	Write a function that describes a relationship between two quantities.★
3-4	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).
3-4	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ³ 1.
3-4	Distinguish between situations that can be modeled with linear functions and with exponential functions.
3-4	Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
3-5	Fit a linear function for a scatter plot that suggests a linear association.
3-5	Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
3-5	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.
3-5	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
3-6	Informally assess the fit of a function by plotting and analyzing residuals.
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3-6	Compute (using technology) and interpret the correlation coefficient of a linear fit.
3-6	Distinguish between correlation and causation.
3-6	Fit a linear function for a scatter plot that suggests a linear association.
3-6	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.

4-1	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.
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4-2	Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. For example, represent inequalities describing nutritional and cost constraints

4-3	Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
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4-4	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
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5-0	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: interception
5-1	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.★
5-1	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: interception
5-4	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
5-4	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

6-1	Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. For example, we define 51/3 to be the cube ro
6-1	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
6-2	Distinguish between situations that can be modeled with linear functions and with exponential functions.
6-2	Write a function that describes a relationship between two quantities.★
6-2	Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
6-2	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: interception

6-2	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
6-2	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.★
6-3	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
6-3	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.
6-3	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
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6-3	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.
6-3	Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
6-4	Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ³ 1.
6-4	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.
6-4	Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.★
6-4	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
6-4	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).
6-4	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.

7-1	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
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7-4	Use the structure of an expression to identify ways to rewrite it. For example, see x4 – y4 as (x2)2 – (y2)2, thus recognizing it as a difference of squares that can be factored as (x2 – y2)(x2 + y2).

7-4	Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.
7-5	Interpret parts of an expression, such as terms, factors, and coefficients.
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7-7	Interpret parts of an expression, such as terms, factors, and coefficients.

8-5	Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
8-5	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.