Davison Community Schools
Algebra 2

Course Outline

Unit 1: Linear Functions and Systems
Unit 2: Quadratic Functions and Equations
Unit 3: Polynomial Functions
Unit 4: Rational Functions
Unit 5: Rational Exponents and Radical Functions
Unit 6: Exponential and Logarithmic Functions
Unit 7: Trigonometric Functions
Unit 8: Trigonometric Equations and Identities
Unit 9: Conic Sections
Unit 10: Matrices
Unit 11: Data Analysis and Statistics
Unit 12: Probability

Priority Standards

1-1	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.★
1-1	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: intercept
1-1	Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.★
1-2	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
1-2	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
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	Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of va
1-6	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 constra
1-6	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of

	linear equations in two variables.
1-7	Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

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	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: intercep
2-1	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
2-2	Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
2-2	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.
2-2	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: intercep
2-2	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
2-3	Factor a quadratic expression to reveal the zeros of the function it defines.
2-3	Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.
2-3	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).
2-4	Know there is a complex number i such that i2 = –1, and every complex number has the form a + bi with a and b real.
2-4	Use the relation i2 = –1 and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.
2-6	Solve quadratic equations by inspection (e.g., for x2 = 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
2-6	Solve quadratic equations in one variable.
2-6	Solve quadratic equations with real coefficients that have complex solutions.
2-6	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.
2-7	Explain why the x-coordinates of the points where the graphs of the equations y = f(x) and y = g(x) intersect are the solutions of the equation f(x) = g(x); find the solutions approximately, e.g., using technology to graph the functions, make tables of va
2-7	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 x2 + y2 = 3.

3-1	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.★
3-1	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: intercept
3-1	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
3-2	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.
3-2	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
3-2	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.
3-4	Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x – a is p(a), so p(a) = 0 if and only if (x – a) is a factor of p(x).
3-4	Rewrite simple rational expressions in different forms; write a(x)/b(x) in the form q(x) + r(x)/b(x), where a(x), b(x), q(x), and r(x) are polynomials with the degree of r(x) less than the degree of b(x), using inspection, long division, or, for the more
3-4	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).
3-5	Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
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3-7	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

4-3	(+) Understand that rational expressions form a system analogous to the rational numbers, closed under addition, subtraction, multiplication, and division by a nonzero rational expression; add, subtract, multiply, and divide rational expressions.
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4-5	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.
4-5	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.
4-5	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

5-1	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.
5-1	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
5-1	Rewrite expressions involving radicals and rational exponents using the properties of exponents.
5-2	Interpret expressions that represent a quantity in terms of its context.★
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5-3	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: intercep
5-3	Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
5-3	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

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5-4	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.
5-4	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.
5-4	Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

6-1	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 whic
6-1	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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6-1	Interpret the parameters in a linear or exponential function in terms of a context.
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6-2	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).
6-2	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.
6-2	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.
6-2	Interpret the parameters in a linear or exponential function in terms of a context.
6-2	Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.
6-2	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)t/10, and classify them as representing exponential gr
6-2	Use the properties of exponents to transform expressions for exponential functions. For example the

	expression 1.15t can be rewritten as (1.151/12)12t ≈1.01212t to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.
6-2	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).
6-2	Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

11-1	Define appropriate quantities for the purpose of descriptive modeling.
11-1	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
11-2	Evaluate reports based on data.
11-2	Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
11-2	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
11-3	Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question t
11-3	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.
11-3	Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to est
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11-5	Evaluate reports based on data.
11-5	Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
11-5	Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

12-1	Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the

	model.
12-1	Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (“or,” “and,” “not”).
12-1	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung canc
12-1	Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent.
12-2	(+) Apply the general Multiplication Rule in a uniform probability model, P(A and B) = P(A)P(B|A) = P(B)P(A|B), and interpret the answer in terms of the model.
12-2	Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. For e
12-2	Find the conditional probability of A given B as the fraction of B’s outcomes that also belong to A, and interpret the answer in terms of the model.
12-2	Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung canc
12-2	Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the