Mohawk Local Schools Algebra 1

Quarter-4 Curriculum Guide

Mathematical Practices

1. Make Sense of Problems and Persevere in Solving them
2. Reasoning Abstractly & Quantitatively
3. Construct Viable Arguments and Critique the Reasoning of Others
4. Model with Mathematics
5. Use Appropriate Tools Strategically
6. Attend to Precision
7. Look for and Make use of Structure
8. Look for and Express Regularity in Repeated Reasoning

Critical Areas of Focus Being Addressed:

- Numbers, Quantities, Equations and Expressions
- Functions
- Statistics

Content Statements Addressed and Whether they are Knowledge, Reasoning, Performance Skill, or Product: (DOK1) (DOK2) (DOK3) (DOK4)	Underpinning Targets Corresponding with Standards and Whether they are Knowledge, Reasoning, Performance Skill, or Product: "I can…..", "Students Will Be Able To……."
F.IF.4 (DOK 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: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*(*Modeling standard)	(DOK 1) I can… • Define and recognize the key features in tables and graphs of linear and exponential functions: intercepts; intervals where the function is increasing, decreasing, positive, or negative, and end behavior. • Identify whether the function is linear or exponential, given its table or graph. (DOK 2) I can… • Interpret key features of graphs and tables of functions in the terms of the contextual quantities the function represents. • Sketch graphs showing key features of a function that models a relationship between two quantities from a given verbal description of the relationship.
F.IF.6 (DOK 2)	(DOK 1) I can…

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.*(Modeling standard)	• Recognize slope as an average rate of change. • Calculate 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 linear or exponential graph (DOK 2) I can… • Interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval.
F.IF.7a (DOK 1) Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*(Modeling standard) a. Graph linear and quadratic functions and show intercepts, maxima, and minima.	(DOK 1) I can… • Graph linear functions by hand in simple cases or using technology for more complicated cases and show/label intercepts of the graph.
F.IF.7b (DOK 2) Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*(Modeling standard) b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions	(DOK 1) I can… • Graph square root, cube root, and piecewise defined functions, including step functions and absolute value functions, by hand in simple cases or using technology for more complicated cases, and show/label key features of the graph. (DOK 2) I can… • Determine the difference between simple and complicated linear, quadratic, square root, cube root, and piecewise-defined functions, including step functions and absolute value functions and know when the use of technology is appropriate. • Compare and contrast the domain and range of absolute value, step and piece-wise defined functions with linear, quadratic, and exponential.
F.IF.8a (DOK 2) 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.	(DOK 1) I can… • Identify different forms of a quadratic expression. • Write functions in equivalent forms using the process of factoring • Identify zeros, extreme values, and symmetry of the graph of a quadratic function (DOK 2) I can… • Interpret different but equivalent forms of a function defined by an expression in terms of a context • 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
F.LE.1a (DOK 2) Distinguish between situations that can be modeled 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.	(DOK 1) I can… • Recognize that linear functions grow by equal differences over equal intervals. • Recognize that exponential functions grow by equal factors over equal intervals. (DOK 2) I can…

	• Distinguish between situations that can be modeled with linear functions and with exponential functions to solve mathematical and real-world problems. • Prove that linear functions grow by equal differences over equal intervals. • Prove that exponential functions grow by equal factors over equal intervals.
A.REI.4a (DOK 2) 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.	(DOK 1) I can… • 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. • Solve quadratic equations in one variable (DOK 2) I can… • Derive the quadratic formula by completing the square on a quadratic equation in x.
A.REI.4b (DOK 2) Solve quadratic equations in one variable. 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 ± bi for real numbers a and b	(DOK 1) I can… • Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring • Express complex solutions as a ± bi for real numbers solutions as a and b. (DOK 2) I can… • Determine appropriate strategies (see first knowledge target listed) to solve problems involving quadratic equations, as appropriate to the initial form of the equation. • Recognize when the quadratic formula gives complex solutions.
A.REI.7 (DOK 1) 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 $x^2 + y^2 = 3$.	(DOK 1) I can… • Transform a simple system consisting of a linear equation and a quadratic equation in 2 variables so that a solution can be found algebraically and graphically. (DOK 2) I can… • Explain the correspondence between the algebraic & graphical solutions to a simple system consisting of a linear equation and a quadratic equation in 2 variables.
A.REI.11 (DOK 2) 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 values, or find successive approximations. Include cases where f(x) and/or g(x) are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.* (Modeling standard)	(DOK 1) I can… • Recognize and use function notation to represent linear and exponential equations • Recognize that if (x1, y1) and (x2, y2) share the same location in the coordinate plane that x1 = x2 and y1 = y2. • Recognize that $f(x) = g(x)$ means that there may be particular inputs of f and g for which the outputs of f and g are equal.

	(DOK 2) I can… • Explain why the x-coordinates of the points where the graph of the equations y=f(x) and y=g(x) intersect are the solutions of the equations f(x) = g(x) . (Include cases where f(x) and/or g(x) are linear and exponential equations
S.ID.2 (DOK 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. (Statistics and Probability is a Modeling Conceptual Category.)	(DOK 1) I can… • Choose a summary statistic appropriate to the characteristics of the data distribution such as the shape of the distribution or the existence of extreme data points (DOK 2) I can… • Choose the appropriate measure for center (mean, median) and spread (interquartile range, standard deviation) based on the shape of a data distribution. • Use appropriate statistics for center and spread to compare two or more data sets.
S.ID.3 (DOK 2) Interpret differences in shape, center and spread in the context of data sets, accounting for possible effects of extreme data points (outliers). (Statistics and Probability is a Modeling Conceptual Category.)	(DOK 1) I can… • Define "the context of data sets" as meaning the specific nature of the attributes under investigation. (DOK 2) I can… • Interpret differences in shape, center and spread in the context of data sets. • Describe the possible effects the presence of outliers in a set of data can have on shape, center, and spread in the context of the data sets.
S.ID.5 (DOK 2) 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. (Statistics and Probability is a Modeling Conceptual Category.)	(DOK 1) I can… • Recognize the differences between joint, marginal and conditional relative frequencies. • Calculate relative frequencies including joint, marginal and conditional relative frequencies. • Summarize categorical data for two categories in two-way frequency tables. (DOK 2) I can… • Interpret relative frequencies in the context of the data. • Recognize possible associations and trends in the data.
N.RN.2 (DOK 1) Rewrite expressions involving radicals and rational exponents using the properties of exponents.	(DOK 1) I can… • Using the properties of exponents, rewrite a radical expression as an expression with a rational exponent. • Using the properties of exponents, rewrite an expression with a rational exponent as a radical expression
N.RN.3 (DOK 2) 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	(DOK 1) I can… • Find the sums and products of rational and irrational numbers. Recognize that the sum of a rational number and an irrational number

product of a nonzero rational number and an irrational number is irrational.	is irrational. Recognize that the product of a nonzero rational number and an irrational number is irrational. (DOK 2) I can… • Explain why rational numbers are closed under addition or multiplication.
A.CED.2 (DOK 2) Create equations in two or more variables to represent relationships between quantities, graph equations on a coordinate axes with labels and scales	(DOK 1) I can… • Identify the quantities in a mathematical problem or real world situation that should be represented by distinct variables and describe what quantities the variables represent. • Graph one or more created equation on a coordinate axes with appropriate labels and scales. (DOK 2) I can… • Create at least two equations in two or more variables to represent relationships between quantities • Justify which quantities in a mathematical problem or real-world situation are dependent and independent of one another and which operations represent those relationships. • Determine appropriate units for the labels and scale of a graph depicting the relationship between equations created in two or more variables.