Mohawk Local Schools Algebra 1

Quarter-3 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

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……."
A.APR.1 (DOK 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.	(DOK 1) I can… • Identify that the sum, difference, or product of two polynomials will always be a polynomial, which means that polynomials are closed under the operations of addition, subtraction, and multiplication. • Define "closure". • Apply arithmetic operations of addition, subtraction, and multiplication to polynomials.
A.CED.1 (DOK 2) 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.	(DOK 1) I can… • Solve linear and exponential equations in one variable. • Solve inequalities in one variable. • Describe the relationships between the quantities in the problem (for example, how the quantities are changing or growing with respect to

	each other); express these relationships using mathematical operations to create an appropriate equation or inequality to solve. (DOK 2) I can… • Create equations (linear and exponential) and inequalities in one variable and use them to solve problems. • Create equations and inequalities in one variable to model real-world situations. • Compare and contrast problems that can be solved by different types of equations (linear & exponential).
A.CED.3 (DOK 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.	(DOK 1) I can… • Recognize when a modeling context involves constraints. (DOK 2) I can… • Interpret solutions as viable or nonviable options in a modeling context. • Determine when a problem should be represented by equations, inequalities, systems of equations and/ or inequalities. • Represent constraints by equations or inequalities, and by systems of equations and/or inequalities.
A.REI.1 (DOK 2) 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	(DOK 1) I can • Know that solving an equation means that the equation remains balanced during each step. • Recall the properties of equality. • Explain why, when solving equations, it is assumed that the original equation is equal. (DOK 2) I can … • Determine if an equation has a solution. • Choose an appropriate method for solving the equation. • Justify solution(s) to equations by explaining each step in solving a simple equation using the properties of equality, beginning with the assumption that the original equation is equal. • Construct a mathematically viable argument justifying a given, or self-generated, solution method.
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 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.

A.REI.5 (DOK 2) 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.	(DOK 1) I can… • Recognize and use properties of equality to maintain equivalent systems of equations. (DOK 2) I can… • Justify that replacing one equation in a two-equation system with the sum of that equation and a multiple of the other will yield the same solutions as the original system.
A.REI.6 (DOK 2) Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.	(DOK 1) I can… • Solve systems of linear equations by any method. (DOK 2) I can… • Justify the method used to solve systems of linear equations exactly and approximately focusing on pairs of linear equations in two 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)
A.REI.12 (DOK 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 half-planes.	(DOK 1) I can… • Identify characteristics of a linear inequality and system of linear inequalities, such as: boundary line (where appropriate), shading, and determining appropriate test points to perform tests to find a solution set. (DOK 2) I can… • Explain the meaning of the intersection of the shaded regions in a system of linear inequalities. (DOK 4) I can… • Graph a line, or boundary line, and shade the appropriate region for a two variable linear inequality. • Graph a system of linear inequalities and shade the appropriate overlapping region for a system of linear inequalities.

A.SSE.1a (DOK 2) Interpret expressions that represent a quantity in terms of its context.*(*Modeling standard) a. Interpret parts of an expression, such as terms, factors, and coefficients.	(DOK 1) I can… • For expressions that represent a contextual quantity, define and recognize parts of an expression, such as terms, factors, and coefficients. (DOK 2) I can… • For expressions that represent a contextual quantity, interpret complicated expressions, in terms of the context, by viewing one or more of their parts as a single entity.
A.SSE.2 (DOK 2) Use the structure of an expression to identify ways to rewrite it.	(DOK 1) I can… • Identify ways to rewrite expressions, such as difference of squares, factoring out a common monomial, regrouping, etc. Identify various structures of expressions (DOK 2) I can… • Use the structure of an expression to identify ways to rewrite it. • Classify expressions by structure and develop strategies to assist in classification
A.SSE.3a (DOK 2) Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*(Modeling standard) a. Factor a quadratic expression to reveal the zeros of the function it defines	(DOK 1) I can… • Factor a quadratic expression to produce an equivalent form of the original expression • Explain the connection between the factored form of a quadratic expression and the zeros of the function it defines. • Explain the properties of the quantity represented by the quadratic expression (DOK 2) • Choose and produce an equivalent form of a quadratic expression to reveal and explain properties of the quantity represented by the original expression.
F.BF.2 (DOK 1) Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*(*Modeling standard)	(DOK 1) I can… • Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers
F.LE.2 (DOK 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).	(DOK 1) I can… • Recognize arithmetic sequences can be expressed as linear functions. • Recognize geometric sequences can be expressed as exponential functions. Construct linear functions, including arithmetic sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). • Construct exponential functions, including geometric sequences, given a graph, a description of a relationship, or two input output pairs (include reading these from a table).

	(DOK 2) I can… • Determine when a graph, a description of a relationship, or two input-output pairs (include reading these from a table) represents a linear or exponential function in order to solve problems.
N.RN.1 (DOK 2) 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 $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.	(DOK 1) I can… • Define radical notation as a convention used to represent rational exponents. (DOK 2) I can… • Explain the properties of operations of rational exponents as an extension of the properties of integer exponents. • Explain how radical notation, rational exponents, and properties of integer exponents relate to one another.
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.
F.IF.3 (DOK 1) 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 $n \geq 1$.	(DOK 1) I can… • Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers
F.IF.5 (DOK 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 would be an appropriate domain for the function.*(*Modeling standard)	(DOK 1) I can… • Given the graph or a verbal/written description of a function, identify and describe the domain of the function. • Identify an appropriate domain based on the unit, quantity, and type of function it describes. (DOK 2) I can… • Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. • Explain why a domain is appropriate for a given real-world situation.