Algebra 1 Grade Level, Advanced, GT
2022-23 Year at a Glance (YAG)

First Semester		Second Semester	
1st Nine Weeks – 41 days (August 15th – October 12th) *(September 5th – No School)* *(October 10th – No School)*		**3rd Nine Weeks – 47 days** (January 3rd – March 10th) *(January 18th – No School)* *(February 20th – PD Day)* *(March 13th – 17th – Spring Break)* *(March 20th – Teacher Workday)*	
TEKS A.2D, **A.5A**, A.10A, A.10C, A10.D, A.12E	**Linear Expressions and Equations (10 days)** Students define polynomial expressions and perform operations with polynomials of degree one, including rewriting a polynomial to an equivalent form when distributing by a rational scale factor. Students make connections between expressions and equations, and solve linear equations in one variable, including variables on both sides and the application of the distributive property. Students model both mathematical and real-world problem situations using equations. Students solve mathematical formulas, scientific formulas, and other literal equations for a specified variable. Students write and solve problems involving direct variation.	**TEKS** A.11A, **A.11B**	**Laws of Exponents (10 days)** Students simplify numeric and algebraic expressions and solve equations using the laws of exponents, including integral and rational exponents and simplifying radical expressions.
A.2A, A.2H, **A.3C**, A.3E, A.12A, A.12B	**Investigation of Linear Functions (15 days)** Students decide whether relations represented verbally, tabularly, graphically, and symbolically define a function. Students determine domain (continuous and discrete) and range of linear functions representing domain and range using inequality notation and verbal descriptions for mathematical problems. Students determine the reasonableness of domain (continuous and discrete) and range in real-world situations. Students evaluate functions, expressed in function notation, given one or more elements in their domains. Students graph linear functions on the coordinate plane given tables, verbal descriptions, and algebraic generalizations. Students graph linear functions in two variables, identify key features, including *x*-intercept, *y*-intercept, zeros, and slope, in mathematical and real-world problems. Students determine the effects on the graph of the parent function $f(x) = x$, including multiple parameter changes within one linear function.	A.6A, **A.7A***, A.7C, A.10A, A.10B, A.10C, A.10D, **A.10E**, A.10F	**Quadratic Functions (35 days)** Part 1: Students perform operations (addition, subtraction, multiplication) with polynomials of degree one and degree two, including rewriting a polynomial to an equivalent form using the distributive property. Part 2: Students graph quadratic functions on the coordinate plane identifying key attributes, including y-intercept, x-intercept(s), zeros, maximum value, minimum value, vertex, and the equation of the axis of symmetry, when applicable. Students determine the effects on the graph of the parent function $f(x) = x^2$ when f(x) is replaced by af(x), f(x) + d, f(x-c), f(bx) for specific values of a, b, c, and d and identify effects of parameter changes of quadratic functions in terms of the problem situation. Students determine the domain and range of quadratic functions and represent the domain and range using inequalities
A.2B, **A.2C***, A.3A, **A.3B**	**Application of Linear Functions (12 days)** Students calculate the rate of change for a linear function in mathematical and real world problems from tables, graphs, and algebraic methods. Students determine the slope of a line given a table, graph, two points on the line, and an equation written in various forms. Students make connections between rate of change and slope of the line. Students write linear equations in two variables from given information, including a table of values, a graph, a verbal description, one point and the slope, two points, and represent the linear equations in various forms. Students write linear functions for real-world situations, and model the linear functions using various representations. Students determine whether the slope of a line is zero or undefined.		**Interim Assessments (2 Days)** The units this nine weeks start laying the foundation for knowledge of nonlinear functions. Students need a basic understanding of properties of exponents as they build upon their number sense moving forward in mathematics. Here we are also laying the groundwork for Quadratic functions which students will continue to study in upper math classes in high school and college.
	Beginning of the School Year (1 Day) **BOY Screener (2 Days)** **Buffer time (1 Day)**		

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	All units this grading period are foundational to Algebra 1 knowledge. Knowing how to write, solve, and graph linear equations is foundational to being able to do the same with non-linear functions. -		
2nd Nine Weeks – 42 days (October 13th – December 16st) *(November 21st – 25th – Thanksgiving Break)* *(December 19th – January 1st – Holiday Break)* *(January 2nd – Teacher Workday)*		**4th Nine Weeks – 45 days** (March 21st – May 24th) *(April 7th – No School)* (*April 28th – No School)*	
TEKS A.4A, A.4B, A.4C, A.2E, A.2F, A.2G	**Application of Linear Functions (con't) (10 days)** Students write, with and without technology, linear functions, analyze the strength of the linear function using scatterplots and linear correlations, compare association and causation between the variables, and estimate solutions and make predictions in terms of the problem situation. Students write linear equations in two variables from a graph, given one point and the slope, two points, a point and parallel to a given line, a point and perpendicular to a given line, or a line parallel or perpendicular to the *x*- or *y*-axis, and represent the linear equations in various forms.	**TEKS** A.6B*, A.6C, A.7B, **A.8A***, A.8B	**Quadratic Functions con't (10 days)** Part 3: Students apply the distributive property to factor out the greatest common factor of the terms in a polynomial expression. Students also factor binomials (difference of two squares) and factor trinomials ($ax^2 + bx + c$) having real roots, including perfect square trinomials of degree two, and justify the results by multiplication. Students describe the relationship between the linear factors of quadratic expressions and the zeros of their associated functions and write quadratic functions when given real solutions and graphs of their related equations. Students write equations of quadratic functions given the vertex and another point on the graph, in vertex form and rewrite the equation from vertex form to standard form. Students formulate quadratic functions for real-world problem situations over an appropriate domain and range given various attributes, identify key attributes in terms of the problem situation, and justify the meaning of key attributes in terms of the problem situation. Students will solve quadratic equations using factoring, square roots, completing the square, and the quadratic formula.
A.2I, A.3F, A.3G, **A.5C***	**Systems of Linear Equations (15 days)** Students analyze a table of values representing a system of two linear equations in two variables and determine the solutions, if they exist. Students graph systems of two linear equations in two variables on the coordinate plane and determine the solutions, if they exist. Students solve systems of two linear equations with two variables for mathematical problems, including substitution and elimination methods.		
A.5B, A.2H, **A.3D**, A.3H*	**Linear Inequalities and Systems of Linear Inequalities (10 days)** Students solve linear inequalities in one variable, including variables on both sides and the application of the distributive property. Students model both mathematical and real-world problem situations using inequalities. Students graph the solution set of systems of two linear inequalities in two variables on the coordinate plane, and formulate and solve graphically two linear inequalities in two variables in real-world problem situations and justify the solution. Students write linear inequalities in two variables given a table of values, a graph, and a verbal description; and graph the solution set of linear inequalities in two variables on the coordinate plane.	A.9A, A.9B, **A.9C**, A.9D, A.9E	**Exponential Functions (15 days)** Students graph exponential functions that model growth and decay. Students identify key features, including y-intercept and asymptote, and determine the domain and range of exponential functions in the form $f(x) = ab^x$, representing the domain and range using inequality notation and verbal descriptions Students interpret the effect of the values a and b in exponential functions in the form $f(x) = ab^x$ and write exponential function in the form $f(x) = ab^x$ (where b is a rational number greater than 0) to describe problems arising rom mathematical and real-world situations, including growth and decay. Students use technology to write exponential functions that provide a reasonable fit to data to estimate solutions, make predictions, and justify solutions in terms of the problem situation for real-world problems and data collection activities.
	MOY Screener (2 Days) **Final Exams (2 Days)** **Buffer time (3 Days)**	A.12C, A.12D	**Sequences (8 days)** Students define and identify terms of arithmetic and geometric sequences when sequences are given in recursive, explicit, and function notation using recursive processes. Students write a formula for the n^{th} term of arithmetic and geometric sequences in recursive, explicit, and function notation, given the value of several of their terms. Students connect arithmetic sequences to linear functions, graph sequences on the coordinate plane, and compare key attributes of the representative function and
	The goal of this grading period is to finish up all lessons on linear functions in order to start building knowledge of nonlinear functions during the second semester.		

			sequence in mathematical and real-world problems. Students connect geometric sequences to exponential functions, graph sequences on the coordinate plane, and compare key attributes of the representative function and sequence in mathematical and real-world problems. Students compare and contrast arithmetic and geometric sequences in real-world problems and data collections. **EOC Review (4 days)** **EOY Screener (2 Days)** **Final Exams (2 Days)** **STAAR Testing are allotted (4 Days)** Our final quarter of the year, we wrap up Quadratic functions and introduce Exponential functions, our final nonlinear unit. During sequences, students will revisit linear functions (arithmetic sequences) and exponential functions (geometric sequences) in a different form.

Process Standards: A.1A, A.1B, A.1C, A.1D, A.1E, A.1F, A.1G

The process standards describe ways in which students are expected to engage in the content. The process standards weave the other knowledge and skills together so that students may be successful problem solvers and use mathematics efficiently and effectively in daily life. When possible, students will apply mathematics to problems arising in everyday life, society, and the workplace.

Student Expectation

- **A.1A:** Apply mathematics to problems arising in everyday life, society, and the workplace.
- **A.1B:** Use a problem-solving model that incorporates analyzing given information, formulating a plan or strategy, determining a solution, justifying the solution, and evaluating the problem-solving process and the reasonableness of the solution.
- **A.1C:** Select tools, including real objects, manipulatives, paper and pencil, and technology as appropriate, and techniques, including mental math, estimation, and number sense as appropriate, to solve problems.
- **A.1D:** Communicate mathematical ideas, reasoning, and their implications using multiple representations, including symbols, diagrams, graphs, and language as appropriate.
- **A.1E:** Create and use representations to organize, record, and communicate mathematical ideas.
- **A.1F:** Analyze mathematical relationships to connect and communicate mathematical ideas.
- **A.1G:** Display, explain, and justify mathematical ideas and arguments using precise mathematical language in written or oral communication.