G-E-T High School Curriculum
Align, Explore, Empower
Scope and Sequence
Advanced Algebra

Unit 1 - Mastering equations and inequalities.	~ 3 weeks
In this unit, students will … -Apply order of operations -simplify algebraic expressions - solve linear equations and inequalities -solve absolute value equations and inequalities.	

Standards for Advanced Algebra
A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **A-CED.3** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non- viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

Unit 2 - **Mastering graphing functions and inequalities in two variables.**	~ 3 weeks
In this unit, students will … -graph linear equations and inequalities -graph absolute value equations and inequalities -Graph and evaluate piecewise functions -Identify functions and their domains and ranges -Use function notation -Write equations of linear lines given various information.	

Standards for Advanced Algebra
A-REI.10 Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line). **A-REI.12** Graph the solutions to a linear inequalities 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.

Unit 3 - Mastering Systems of Equations and Inequalities	~ 3 weeks
In this unit, students will … -Solve systems of linear equations by graphing, substitution, and elimination methods -Graph systems of linear inequalities - Solve systems of equations in 3 variables -Apply Linear programming to solve applications	

Standards for Advanced Algebra
A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. **A-REI.5** 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. **A-REI.11** 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 $f(x) = g(x)$; nd 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.

Unit 4 - Graphing and Solving Quadratics	~5 weeks
In this unit, students will … -Graph Quadratics using tables and vertex form -Solving Quadratic using graphs, factoring, quadratic formula, and completing the square -Solving and graphing quadratic inequalities -Solve applications of quadratic functions	

Standards for Advanced Algebra
A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. Factor a quadratic expression to reveal the zeros of the function it defines. Complete the

square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A-REI.4 Solve quadratic equations in one variable. 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. 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 $a \pm bi$ for real numbers a and b.

Unit 5 - Trigonometry	~4 weeks

In this unit, students will …
-Use and apply Sine, Cosine, and Tangent to find missing sides and angles in right triangles
-Use and apply the Law of Sines and Cosines to find missing sides and angles in non-right triangles
-understand the unit circle and apply it to solve and evaluate trig equations

Standards for Advanced Algebra

F-TF.1 Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F.TF.2 Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Unit 6 - Polynomials	~ 4 weeks

In this unit, students will …
-apply exponent properties
-add/subtract/multiply/divide(long and synthetic) polynomial expressions
-evaluate polynomials
-factor polynomials by many methods
-graph higher degree polynomials
-state the end behavior of odd and even degree polynomial functions

Standards for Advanced Algebra

A-APR.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.

A-APR.6 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 complicated examples, a computer algebra system.
A-SSE.1 Interpret expressions that represent a quantity in terms of its context. Interpret parts of an expression, such as terms, factors, and coefficients. 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.*

A-APR.7 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.

A.SSE.2 Use the structure of an expression to identify ways to rewrite it. *For example, see* $x^4 - y^4$ *as* $(x^2)^2 - (y^2)^2$, *thus recognizing it as a difference of squares that can be factored as* $(x^2 - y^2)(x^2 + y^2)$.

A.APR.2 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 $p(x)$.

A-SSE.4 Derive the formula for the sum of a nite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.*

A-APR.4 Derive the formula for the sum of a nite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.*

A-APR.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.

Unit 7 - Radical expressions, equations, and inequalities.	~ 3 weeks

In this unit, students will …
-operations with function notation(add/subtract/multiply/composite)
-Finding and proving inverse of functions
-Graphing Radical functions
-simplify rational exponents and nth roots expressions
-solve rational equations and inequalities

Standards for Advanced Algebra

A-REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

N-RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.

N-RN.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 de ne 51/3*

to be the cube root of 5 because we want $(51/3)^3 = 5(1/3)^3$ *to hold, so* $(51/3)^3$ *must equal 5.*

A-APR.5 Know and apply the Binomial Theorem for the expansion of $(x + y)^n$ in powers of x and y for a positive integer n, where x and y are any numbers, with coefficients determined for example by Pascal's Triangle.1

A.APR.4 Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* $(x^2 + y^2)^2 = (x^2 – y^2)^2 + (2xy)^2$ *can be used to generate Pythagorean triples.*

Unit 8 - Exponential and Logarithms ~5 weeks

In this unit, students will …
-graph exponential growth and decay functions
-solving exponential equations and inequalities
-Use the definition and properties of logarithms to solve equations
-Use of common and natural logarithms to solve application problems

Standards for Advanced Algebra

F.IF.8 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 growth or decay.*

F.IF.7 Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

+ **F.BF.5** Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.

F.LE.1 Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

F.LE.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).

Unit 9 - Rational Numbers ~ 4 weeks

In this unit, students will …
-simplify rational expressions and determine excluded values
-add/subtract, multiply, divide rational expressions
-solve rational equations

Standards for Advanced Algebra
A-REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. **N-RN.2** Rewrite expressions involving radicals and rational exponents using the properties of exponents. **N-RN.1** Explain how the de nition 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 de ne 51/3 to be the cube root of 5 because we want (51/3)3 = 5(1/3)3 to hold, so (51/3)3 must equal 5.* **A-APR.5** Know and apply the Binomial Theorem for the expansion of (*x* + *y*)n in powers of *x* and *y* for a positive integer *n*, where *x* and *y* are any numbers, with coefficients determined for example by Pascal's Triangle.1 **A.APR.4** Prove polynomial identities and use them to describe numerical relationships. *For example, the polynomial identity* (*x*2 + *y*2)2 = (*x*2 – *y*2)2 + (2*xy*)2 *can be used to generate Pythagorean triples.*