Algebra I Honors
Subject Group Overview

Unit title	Key concept	Related Concept(s)	Global context & Exploration	Statement of inquiry	MYP subject specific objectives and strands	Content (topics, knowledge, skills)
Unit A: Quantities and Modeling	Form	Model Representation	Scientific and Technical Innovation Models	Discovering mathematical relationships that can lead to a better understanding of how the process of modeling real-world problems and equations benefits global society.	A, B, D: All strands	-Create linear equations in one variable and use them to solve problems (A-CED.1.1) -Create linear inequalities in one variable and use them to solve problems (A-CED.1.1) -Represent constraints by equations in a modeling context. (A-CED.1.3) -Represent constraints by inequalities in a modeling context. (A-CED.1.3) -Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations (A-CED.1.4) -Construct a viable argument to justify a solution method (A-REI.1.1) -Solve linear equations in one variable (A-REI.2.3) -Solve linear equations in one variable with coefficients represented by letters (A-REI.2.3) -Solve linear inequalities in one variable (A-REI.2.3) -Interpret expressions that represent a quantity in terms of its context (A-SSE.1.1) -Use units as a way to understand problems (N-Q.1.1) -Use units to guide the solution of multi-step problems (N-Q.1.1)
Unit B: Understanding Functions	Relationships	Model Representation	Globalization and sustainability Commonality, diversity and interconnection	Models can represent commonality, diversity and interconnection between relationships.	A, B: All strands	-Use function notation. (F-IF.1.2) -Evaluate functions for inputs in their domains. (F-IF.1.2) -Interpret statements that use function notation in terms of context. (F-IF.1.2) -Write a function that defines a given sequence explicitly or recursively. (F-IF.1.3)

						-Interpret key features of graphs and tables in terms of the input and output of a function. (F-IF.2.4) -Sketch graphs that match a verbal description of a function showing key features. (F-IF.2.4) For F-IF.2.4 in this unit, key features are limited to intercepts and intervals where the functions are increasing, decreasing, positive or negative. -Create equations (functions) in two or more variables to represent relationships between quantities. (A-CED.1.2) -Graph equations (functions) on coordinate axes with labels and scales. (A-CED.1.2) -Construct linear functions given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (F-LE.1.2) -Construct arithmetic sequences given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (F-LE.1.2) -Write arithmetic sequences both recursively and with an explicit formula. (H) (F-BF.1.2) -Use arithmetic to model situations and translate between the two forms. (H) (F-BF.1.2) -Use units as a way to understand problems (N-Q.1.1) -Use units to guide the solution of multi-step problems (N-Q.1.1)
Unit C: Linear Functions, Equations and Inequalities	Relationships	Justification Model	GC: Scientific and Technical Innovation Ex: Models	Creating models through equations, graphs and tables, to represent relationships in real world mathematics to justify quantities,	A, B, D: all strands	-Create (linear) equations in two or more variables to represent relationships between quantities. (A-CED.1.2) -Graph (linear) equations on coordinate axes with labels and scales. (A-CED.1.2)

				values and equivalence.		*Represent constraints by equations in a modeling context. (A-CED.1.3)* *-Represent constraints by inequalities in a modeling context. (A-CED.1.3)* *-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). (A-REI.4.11)* *-Find the solutions of the equation f(x) = g(x) approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. (A-REI.4.11)* Graph solutions to a linear inequality in two variables as a half-place (excluding the boundary line in the case of a strict inequality). (A-REI.4.12) -Interpret key features of graphs and tables in terms of the input and output of a function. (F-IF.2.4) -Sketch graphs that match a verbal description of a function showing key features. (F-IF.2.4)For F-IF.2.4 in this unit, key features are limited to intercepts and intervals where the functions are increasing, decreasing, positive or negative. -Graph linear functions and show intercepts. (F-IF.3.7a) -Calculate and interpret the average rate of change of a function over a specified interval (F-IF.2.6) -Estimate the rate of change from a graph (F-IF.2.6) -Interpret the slope and intercept of a linear model in the context of the data. (S-ID.3.7) -Interpret the correlation coefficient of a linear fit. (S-ID.3.8)

						-Construct linear functions given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (F-LE.1.2) -Construct arithmetic sequences given a graph, a description of a relationship, or two input-output pairs (include reading these from a table). (F-LE.1.2) -Fit a function to data and use those functions to solve problems in the context of the data. (S-ID.2.6a,c) -Use units as a way to understand problems (N-Q.1.1) -Use units to guide the solution of multi-step problems (N-Q.1.1)
Unit D: Linear Systems and Piecewise-Defined Functions	Relationships	Equivalence Representation	Scientific and Technical Innovation Systems	An understanding of equivalence and in-equivalence among forms of linear relationships enables graphical representations.	A, B, D: all strands	-Create linear and absolute equations in one variable and use them to solve problems (**A-CED.1.1**) -Create linear and absolute inequalities in one variable and use them to solve problems (**A-CED.1.1**) -Represent constraints by equations and systems of equations in a modeling context. (**A-CED.1.3**) -Represent constraints by inequalities and systems of inequalities in a modeling context. (**A-CED.1.3**) -Solve linear equations in one variable (**A-REI.2.3**) -Solve linear equations in one variable with coefficients represented by letters (**A-REI.2.3**) -Solve linear inequalities in one variable (**A-REI.2.3**) -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.3.5)** -Solve systems of linear equations exactly. **(A-REI.3.6)**

						-Solve systems of linear equations approximately (e.g. with graphs). **(A-REI.3.6)** -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 for the equation f(x) = g(x). **(A-REI.4.11)** -Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality). **(A-REI.4.12)** -Graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes. **(A-REI.4.12)** -Combine standard function types using arithmetic operations. **(F-BF.1.1b)** -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). **(F-BF.2.3)** -Find the value of k when replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) given the graphs. **(F-BF-2.3)** -Graph functions expressed symbolically, by hand in simple cases and using technology for more complicated cases. **(F-IF.3.7b)** -Show key features of the graph. **(F-IF.3.7b)** -Graph piecewise-defined functions, including step functions and absolute value functions. **(F-IF-3.7b)**

Unit E: Exponential Relationships	Form	Equivalence Simplification	Scientific and Technical Innovation Models	Using methods of simplification create equivalent forms in algebraic expressions.	A, B, D: all strands	-Create equations and inequalities in one variable (from exponential functions). **(A-CED.1.1)** -Use equations and inequalities (from exponential functions) to solve problems. **(A-CED.1.1)** -Create equations in two or more variables to represent relationships between quantities. **(A-CED.1.2)** -Graph equations on coordinate axes with labels and scales. **(A-CED.1.2)** -Solve simple radical equations in one variable. **(A-REI.1.2)** -Generate examples of radical equations with extraneous solutions. **(A-REI.1.2)** -Find solutions for the equation f(x) = g(x). **(A-REI.4.11)** -Use technology to graph f(x) = g(x), make tables of values or find successive approximations. **(A-REI.4.11)** -Evaluate functions for inputs in their domains. **(F-IF.1.2)** -Relate the domain of a function to its graph. **(F-IF.2.5)** -When applicable, relate the domain of a function to the quantitative relationship it describes. **(F-IF.2.5)** -Write a function that describes a relationship between two quantities. **(F-BF.1.1)** -Determine an explicit expression, a recursive process, or steps for calculation from a context. **(F-BF.1.1)** -Combine standard function types using arithmetic operations. **(F-BF.1.1)**

						-Compose functions. **(F-BF.1.1)** -Write arithmetic sequences both recursively and with an explicit formula. **(F-BF.1.2)** -Write geometric sequences both recursively and with an explicit formula. **(F-BF.1.2)** -Use arithmetic and geometric sequences to model situations. **(F-BF.1.2)** -Graph exponential functions, showing intercepts and end behavior. **(F-IF.3.7e)** -Distinguish between situations modeled with linear functions and exponential functions when presented with a real-world problem. **(F-LE.1.1)** -Construct linear and exponential functions given a graph, a description of a relationship or two input-output pairs. **(F-LE.1.2)** -Construct arithmetic and geometric sequences given a graph, a description of a relationship or two input-output pairs. **(F-LE.1.2)** -Rewrite expressions involving radicals and rational exponents using the properties of exponents. **(N-RN.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). **(F-BF.2.3)** -Find the value of k when replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k) given the graphs. **(F-BF-2.3)**

Unit F: Polynominal Functions	Form	Pattern Simplification	Scientific and Technical Innovation Processes and solutions	Understanding form through recognizing patterns and simplifying algebraic expressions.	A: all strands	-Add, subtract, and multiply polynomials. **(A-APR.1.1)** -Create equations in one variable and use them to solve problems. **(A-CED.1.1)** -Create inequalities in one variable and use them to solve problems. **(A-CED.1.1)** -Interpret parts of an expression such as terms, factors and coefficients in terms of its context. **(A-SSE.1.1)** -Interpret complicated expressions by viewing one or more of their parts as a single entity. **(A-SSE.1.1)** -Use the structure of an expression to identify ways to rewrite it. **(A-SSE.1.2)**
Unit G: Quadratic Functions	Relationships	Model Representation	Scientific and Technical Innovation Models	Understanding quadratic relationships through multiple representations and models.	A, C, D: all strands	-Add, subtract, and multiply polynomials. **(A-APR.1.1)** -Use the structure of an expression to identify ways to rewrite it. **(A-SSE.1.2)** -Use the zeros of polynomials to construct a rough graph of the function defined by the polynomial. **(A-APR.2.3)** -Write a function that describes a relationship between two quantities. **(F-BF.1.1)** -Determine an explicit expression, a recursive process or steps for calculating. **(F-BF.1.1)** -Evaluate functions for inputs in their domain. **(F-IF.1.2)** -Interpret statements that use function notation in terms of a context. **(F-IF.1.2)** -Graph linear and quadratic functions and show intercepts, maxima, and

						minima. **(F-IF.3.7a)** -Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end beha **(F-IF.3.7c)** -Find the value of k given the graphs when replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k). **(F-BF.2.3)**
Unit H: Quadratic Equations and Modeling	Logic	Equivalence Simplification	Scientific and Technical Innovation Processes and products	A logical process of simplifying quadratic functions and determining equivalence.	A, B, C: all strands	-Create equations and inequalities in one variable. **(A-CED.1.1)** -Use equations and inequalities to solve problems. **(A-CED.1.1)** -Create equations in two or more variables to represent relationships between quantities. **(A-CED.1.2)** -Graph equations on coordinate axes with labels and scales. **(A-CED.1.2)** -Solve quadratic equations in one variable **(A-REI.2.4)** -Use 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. **(A-REI.2.4)** -Derive the quadratic formula from an equation in the form $(x – p)^2 = q$. **(A-REI.2.4)** -Solve quadratic equations by inspection (e.g., for $x^2 = 49$) as appropriate to the initial form of the equation. **(A-REI.2.4)** -Solve quadratic equations by taking square roots as appropriate to the initial form of the equation. **(A-REI.2.4)** -Solve quadratic equations by completing the square as appropriate to the initial form of the equation. **(A-REI.2.4)**

						-Solve quadratic equations by the quadratic formula as appropriate to the initial form of the equation. **REI.2.4)** -Solve quadratic equations by factoring as appropriate to the initial form of the equation. **(A-REI.2.4)** -Factor a quadratic expression to reveal the zeros of the function it defines. **(A-SSE.2.3)** -Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. **(A-SSE.2.3)** -Calculate the average rate of change of a function (presented symbolically or as a table) over a specified interval. **(F-IF.2.6)**- Interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. **(F-IF.2.6)** -Use the process of factoring in a quadratic function to show zeros, extreme values, and symmetry of the graph. **(F-IF.3.8a)** -Interpret the zeros, extreme values, and symmetry of quadratic functions in terms of a context. (**F-IF.3.8a)** -Use the process of completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph. **(F-IF.3.8a)** -Use polynomial identities to describe numerical relationships. **(A-APR.3.4)** -Solve a system consisting of a linear equation and a quadratic equation in two variables algebraically **(*A-**

						REI.3.7) -Solve a system consisting of a linear equation and a quadratic equation in two variables graphically. **(*A-REI.3.7)**
Unit I: Statistical Models- Frequency Tables and One-Variable Data Distributions	Logic	Measurement Model	Orientation in Space and Time Frequency and variability	Through measurement and modeling, one can make logical deductions about data.	A, C: all strands	-Summarize categorical data for two categories in two-way frequency tables. **(S-ID.2.5)** -Represent data with plots on the real number line (dot plots, histograms, and box plots). **(S-ID.1.1)** -Use statistics appropriate to the shape of the data distribution to compare spread (interquartile range, standard deviation) of two or more different data sets. **(S-ID.1.2)** -Use statistics appropriate to the shape of the data distribution to compare center (median, mean) of two or more different data sets. **(S-ID.1.2)** -Use the mean and standard deviation of a data set to fit it to a normal distribution **(*S-ID.1.4)** -Use the mean and standard deviation of a data set to estimate population percentages. **(*S-ID.1.4)**
Unit J: Inverse Functions	Form	Pattern Representation	Scientific and Technical Innovation	Recognize forms of functions through patterns and graphical representations.	A, B: all strands	-Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. **(A-CED.1.4)** -Graph square root, cube root, piecewise-defined functions, including step functions and absolute value functions. **(F-IF.3.7b)** -Graph polynomial functions, identifying zeros when suitable factorizations are available. **(F-IF.3.7c)**

						-Graph polynomial functions showing end behavior. **(F-IF.3.7c)** -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. **(F-BF.2.3)** -Find the value of k given the graphs when replacing f(x) by f(x) + k, k f(x), f(kx), and f(x + k). **(F-BF.2.3)** -For a function that models a relationship between two quantities, interpret key features of graphs and tables. **(F-IF.2.4)** -For a function that models a relationship between two quantities, sketch graphs showing key features given a verbal description of the relationship. **(F-IF.2.4)** -Find inverse functions. **(F-BF.2.4)** -Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse.**(F-BF.2.4)**