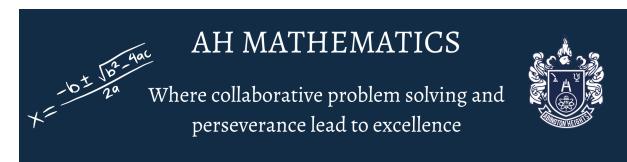# Abington Heights School District Grade 8 Algebra I Accelerated Mathematics Curriculum

In Eighth Grade Algebra I Accelerated, students develop their numeracy skills through the following areas of study:

1. Number and Quantity
2. Algebra
3. Functions
4. Geometry
5. Statistics and Probability

Board Approval Date: 5/3/2023
Adoption: 2023 - 2024 SY
Review Date:

AH MATHEMATICS

Where collaborative problem solving and perseverance lead to excellence

Abington Heights Math Framework

Stakeholders	Actions
Students	★ Engage in mathematical discussions, share their ideas openly, be inquisitive, seek to understand and learn more about mathematical concepts, and try their best daily. ★ Exhibit creativity and curiosity in problem solving individually and collaboratively. ★ Persevere in engaging and challenging daily mathematical practice. ★ Come prepared to learn every day.
Teachers	★ Create a safe and collaborative classroom environment where students feel vested in a shared vision for mathematical excellence. ★ Develop high quality instruction that meets the needs of all learners through differentiation. ★ Use a variety of 21st century methodologies to advance learning. ★ Partner with parents and guardians to support student success. ★ Establish a collaborative community within the building and amongst grade levels to ensure a cohesive level of instruction.

Building Leaders	★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores
	  ○ Knowledgeable about program and grade level standards
	  ○ Ensure consistent and equal access to high-quality instructional materials and resources, building.
	★ Be partners with teachers, students and families:
	  ○ Provide guidance and support to the mathematical community.
	  ○ Understand needs of teachers, students and families.
	★ Trust the educators to make professional decisions based on program, student, and district needs.

Central Admin	★ Effectively communicate to the school board and community specific areas of need and how to support teachers and building leaders in a quest for mathematical excellence
	★ Deeply understand the needs of teachers, students, the instructional materials being used, programs being implemented, and the expectations for state-level assessment scores
	  ○ Have a common metric for mathematical excellence.
	  ○ Ensure consistent and equal access to high-quality instructional materials and resources, district.
	  ○ Re-examine best practices/curriculum routinely (6 years).
	★ Support a culture of collaboration between the other stakeholder groups to maintain the standard of excellence of the Abington Heights
	★ Trust the educators to make professional decisions based on program, student, and district needs.

Parents/ Community	★ Be a strong support system and contribute by building a positive math community for students. ★ Encourage a positive math mindset. ★ Have conversations with their children about school and ask what they are learning about in school. ★ Be open, receptive to the district's ideas about student learning and reach out to teachers/school to learn more about how they can support. ★ Trust the educators to make professional decisions based on program, student, and district needs.

School Board	★ Provide the fiscal resources to support:
	  ○ Highly qualified professionals for mathematics
	  ○ High-quality instructional materials
	  ○ Effective and efficient math interventions for remediation
	  ○ Professional development for math content and instructional practices
	★ Trust the educators to make professional decisions based on program, student, and district needs.

Abington Heights Grade 8 Algebra I Accelerated Mathematics Curriculum

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
Number and Quantity		
CC.2.1.HS.F.1 Apply and extend the properties of exponents to solve problems with rational exponents.	A1.1.1.1.1 Compare and/or order any real numbers. Note: Rational and irrational may be mixed. A1.1.1.1.2 Simplify square roots (e.g., √24 = 2√6). A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from −10 to 10.	6.2, 6.3
CC.2.1.HS.F.2 Apply properties of rational and irrational numbers to solve real world or mathematical problems.	A1.1.1.1.1 Compare and/or order any real numbers. Note: Rational and irrational may be mixed. A1.1.1.1.2 Simplify square roots (e.g., √24 = 2√6). A1.1.1.3.1 Simplify/evaluate expressions involving properties/laws of exponents, roots, and/or absolute values to solve problems. Note: Exponents should be integers from −10 to 10. A1.1.1.2.1 Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials.	6.1
CC.2.1.HS.F.3 Apply quantitative reasoning to choose and interpret units and scales in formulas, graphs, and data displays.	A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations). A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only. A1.1.2.1.3 Interpret solutions to problems in the context of the	1.1, 1.4, 2.1, 3.2, 4.5, 6.1

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	problem situation. Note: Linear equations only. A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation).	
Algebra		
CC.2.2.HS.D.1 Interpret the structure of expressions to represent a quantity in terms of its context.	A1.1.1.5.1 Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial. A1.1.1.5.2 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials are limited to the form $ax^2 + bx + c$ where a is equal to 1 after factoring out all monomial factors. A1.1.1.5.3 Simplify/reduce a rational algebraic expression.	7.1, 7.6, 7.7, 7.8, 7.9, 11.3, 11.4, 11.5
CC.2.2.HS.D.2 Write expressions in equivalent forms to solve problems.	A1.1.1.5.1 Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial. A1.1.1.5.2 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials are limited to the form $ax^2 + bx + c$ where a is equal to 1 after factoring out all monomial factors. A1.1.1.5.3 Simplify/reduce a rational algebraic expression.	7.6, 7.7, 7.8, 7.9
CC.2.2.HS.D.3 Extend the knowledge of arithmetic operations and apply to polynomials.	A1.1.1.5.1 Add, subtract, and/or multiply polynomial expressions (express answers in simplest form). Note: Nothing larger than a binomial multiplied by a trinomial.	7.2, 7.3, 7.4

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	A1.1.1.5.2 Factor algebraic expressions, including difference of squares and trinomials. Note: Trinomials are limited to the form ax² + bx + c where a is equal to 1 after factoring out all monomial factors. A1.1.1.5.3 Simplify/reduce a rational algebraic expression.	
CC.2.2.HS.D.7 Create and graph equations or inequalities to describe numbers or relationships.	A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations). A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only. A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations. A1.1.3.1.1 Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). A1.1.3.1.2 Identify or graph the solution set to a linear inequality on a number line. A1.1.3.1.3 Interpret solutions to problems in the context of the	1.1, 1.2, 1.3, 1.4, 2.1, 2.3, 2.4, 2.5, 2.6, 2.7, 3.1, 3.2, 3.3, 3.4, 4.1, 4.2, 4.3, 4.4, 4.5, 11.2

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	problem situation. Note: Linear inequalities only. A1.1.3.2.1 Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. A1.1.3.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities.	
CC.2.2.8.B.3 Analyze and solve linear equations and pairs of simultaneous linear equations.	M08.B-E.3.1.1 Write and identify linear equations in one variable with one solution, infinitely many solutions, or no solutions. Show which of these possibilities is the case by successively transforming the given equation into simpler forms until an equivalent equation of the form $x = a$, $a = a$, or $a = b$ results (where a and b are different numbers). M08.B-E.3.1.2 Solve linear equations that have rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and collecting like terms. M08.B-E.3.1.3 Interpret solutions to a system of two linear equations in two variables as points of intersection of their graphs because points of intersection satisfy both equations simultaneously. M08.B-E.3.1.4 Solve systems of two linear equations in two variables algebraically and estimate solutions by graphing the equations. Solve simple cases by inspection. Example: $3x + 2y = 5$ and $3x + 2y = 6$ have no solution because $3x + 2y$ cannot simultaneously be 5 and 6. M08.B-E.3.1.5 Solve real-world and mathematical problems leading to two linear equations in two variables. Example: Given	4.1, 4.2, 4.3, 4.4

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	coordinates for two pairs of points, determine whether the line through the first pair of points intersects the line through the second pair.	
CC.2.2.HS.D.9 Use reasoning to solve equations and justify the solution method.	A1.1.1.4.1 Use estimation to solve problems. A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations). A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only. A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations. A1.1.3.1.1 Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). A1.1.3.1.2 Identify or graph the solution set to a linear inequality on a number line. A1.1.3.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear inequalities only.	1.1, 1.2, 1.3
CC.2.2.HS.D.10 Represent, solve, and interpret	A1.1.2.1.1 Write, solve, and/or apply a linear equation (including	1.1, 1.2, 1.3, 2.1, 2.3, 2.4,

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
equations/inequalities and systems of equations/inequalities algebraically and graphically.	problem situations). A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only. A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear equations only. A1.1.2.2.1 Write and/or solve a system of linear equations (including problem situations) using graphing, substitution, and/or elimination. Note: Limit systems to two linear equations. A1.1.2.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear equations. A1.1.3.1.1 Write or solve compound inequalities and/or graph their solution sets on a number line (may include absolute value inequalities). A1.1.3.1.2 Identify or graph the solution set to a linear inequality on a number line. A1.1.3.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear inequalities only. A1.1.3.2.1 Write and/or solve a system of linear inequalities using graphing. Note: Limit systems to two linear inequalities. A1.1.3.2.2 Interpret solutions to problems in the context of the problem situation. Note: Limit systems to two linear inequalities.	2.6, 3.2, 3.3, 3.4, 3.5, 4.1, 4.2, 4.3, 4.4, 4.5, 7.5, 7.6, 7.7, 7.8, 7.9, 11.1, 11.2

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
Functions		
CC.2.2.8.C.1 Define, evaluate, and compare functions.	M08.B-F.1.1.1 Determine whether a relation is a function. M08.B-F.1.1.2 Compare properties of two functions, each represented in a different way (i.e., algebraically, graphically, numerically in tables, or by verbal descriptions). Example: Given a linear function represented by a table of values and a linear function represented by an algebraic expression, determine which function has the greater rate of change. M08.B-F.1.1.3 Interpret the equation $y = mx + b$ as defining a linear function whose graph is a straight line; give examples of functions that are not linear.	2.3, 2.5, 5.1, 5.2, 5.3, 5.4, 5.5
CC.2.2.8.C.2 Use concepts of functions to model relationships between quantities.	M08.B-F.2.1.1 Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (x, y) values, including reading these from a table or from a graph. Interpret the rate of change and initial value of a linear function in terms of the situation it models and in terms of its graph or a table of values. M08.B-F.2.1.2 Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch or determine a graph that exhibits the qualitative features of a function that has been described verbally.	2.7, 5.3, 5.5
CC.2.2.HS.C.1 Use the concept and notation of functions to interpret and apply them in terms of their context.	A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph.	5.1, 5.2, 5.4, 5.6

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). A1.2.2.1.1 Identify, describe, and/or use constant rates of change. A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems. A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, two points on the line, or the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form. A1.2.2.1.4 Determine the slope and/or y-intercept represented by a linear equation or graph.	
CC.2.2.HS.C.2 Graph and analyze functions and use their properties to make connections between the different representations.	A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph. A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation). A1.2.2.1.1 Identify, describe, and/or use constant rates of	2.2, 2.3, 2.4, 2.6, 2.7, 5.1, 5.2, 5.4

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	change.	
CC.2.2.HS.C.3 Write functions or sequences that model relationships between two quantities.	A1.1.2.1.1 Write, solve, and/or apply a linear equation (including problem situations).	2.5, 5.3
	A1.1.2.1.2 Use and/or identify an algebraic property to justify any step in an equation-solving process. Note: Linear equations only.	
	A1.1.2.1.3 Interpret solutions to problems in the context of the problem situation. Note: Linear equations only.	
	A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically.	
	A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph.	
	A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table).	
	A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function.	
	A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation).	
	A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, two points on the line, or the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form.	
	A1.2.2.1.4 Determine the slope and/or y-intercept represented by a linear equation or graph.	

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
CC.2.2.HS.C.4 Interpret the effects transformations have on functions and find the inverses of functions.	A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation).	5.4
CC.2.2.HS.C.5 Construct and compare linear, quadratic, and exponential models to solve problems.	A1.2.2.1.1 Identify, describe, and/or use constant rates of change. A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems. A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, two points on the line, or the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form. A1.2.2.1.4 Determine the slope and/or y-intercept represented by a linear equation or graph.	5.3, 5.5, 5.6
CC.2.2.HS.C.6 Interpret functions in terms of the situations they model.	A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems. A1.2.2.1.3 Write or identify a linear equation when given the graph of the line, two points on the line, or the slope and a point on the line. Note: Linear equation may be in point-slope, standard, and/or slope-intercept form. A1.2.2.2.1 Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot.	2.3

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
Geometry		
CC.2.3.8.A.2 Understand and apply congruence, similarity, and geometric transformations using various tools.	M08.C-G.1.1.1 Identify and apply properties of rotations, reflections, and translations. Example: Angle measures are preserved in rotations, reflections, and translations. M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.	10.3, 10.4
Statistics and Probability		
CC.2.4.8.B.1 Analyze and/or interpret bivariate data displayed in multiple representations. Pennsylvania	M08.D-S.1.1.1 Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative correlation, linear association, and nonlinear association. M08.D-S.1.1.2 For scatter plots that suggest a linear association, identify a line of best fit by judging the closeness of the data points to the line. M08.D-S.1.1.3 Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercept. Example: In a linear model for a biology experiment, interpret a slope of 1.5 cm/hr as meaning that an additional hour of sunlight each day is associated with an additional 1.5 cm in mature plant height.	12.5/KA, 12.6/KA
CC.2.4.8.B.2 Understand that patterns of association can be seen in bivariate data utilizing frequencies.	M08.D-S.1.2.1 Construct and interpret a two-way table summarizing data on two categorical variables collected from the same subjects. Use relative frequencies calculated for rows or columns to describe possible associations between the two variables. Example:Given data on whether students have a	12.7/KA

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
	curfew on school nights and whether they have assigned chores at home, is there evidence that those who have a curfew also tend to have chores?	
CC.2.4.HS.B.1 Summarize, represent, and interpret data on a single count or measurement variable.	A1.2.2.1.2 Apply the concept of linear rate of change (slope) to solve problems. A1.2.3.1.1 Calculate and/or interpret the range, quartiles, and interquartile range of data. A1.2.3.2.2 Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations). A1.2.3.2.3 Make predictions using the equations or graphs of best-fit lines of scatter plots.	12.1/KA, 12.2/KA, 12.3/KA, 12.4/KA, 12.8/KA
CC.2.4.HS.B.2 Summarize, represent, and interpret data on two categorical and quantitative variables.	A1.2.1.1.1 Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically. A1.2.1.1.2 Determine whether a relation is a function, given a set of points or a graph. A1.2.1.1.3 Identify the domain or range of a relation (may be presented as ordered pairs, a graph, or a table). A1.2.1.2.1 Create, interpret, and/or use the equation, graph, or table of a linear function. A1.2.1.2.2 Translate from one representation of a linear function to another (i.e., graph, table, and equation). A1.2.2.2.1 Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot.	12.5/KA, 12.6/KA, 12.7/KA

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Algebra I Lessons
CC.2.4.HS.B.3 Analyze linear models to make interpretations based on the data.	A1.2.2.2.1 Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot. A1.2.3.1.1 Calculate and/or interpret the range, quartiles, and interquartile range of data. A1.2.3.2.2 Analyze data, make predictions, and/or answer questions based on displayed data (box-and-whisker plots, stem-and-leaf plots, scatter plots, measures of central tendency, or other representations). A1.2.3.2.3 Make predictions using the equations or graphs of best-fit lines of scatter plots.	12.5/KA, 12.6/KA

Portrait of an Abington Heights 8th Grade Algebra I Mathematician

By the end of 8th Grade Algebra I Accelerated, students will:

Operations with Real Numbers and Expressions	Linear Equations	Linear Inequalities	Functions	Coordinate Geometry
☐ Compare and/or order any real numbers ☐ Simplify square roots ☐ Find the greatest common factor and/or least common multiple for sets of monomials ☐ Simplify/evaluate expressions involving properties/law of exponents, roots, and/or absolute values to solve problems ☐ Use estimation to solve problems ☐ Add, subtract, and/or multiply polynomial expressions ☐ Factor algebraic expressions, including difference of squares and trinomials ☐ Simplify/reduce rational algebraic expressions	☐ Write, solve, and/or apply a linear equation ☐ Use and/or identify an algebraic property to justify any step in an equation-solving process; interpret solutions in context of the problem situation ☐ Write and/or solve a system of linear equations using graphing, substitution, and/or elimination; interpret solutions in context of the problem situation	☐ Write or solve compound inequalities; graph solutions on number line ☐ Identify or graph the solution set to a linear inequality on a number line; interpret solutions in context of the problem situation ☐ Write and/or solve a system of linear inequalities using graphing; interpret solutions in context of the problem situation	☐ Analyze a set of data for the existence of a pattern and represent the pattern algebraically and/or graphically ☐ Determine whether a relation is a function, given a set of points or a graph ☐ Identify the domain and range of a relation ☐ Create, interpret, and/or translate various representations of a linear function (graph, table, equation)	☐ Identify, describe, and/or use constant rates of change ☐ Apply the concept of linear rate of change (slope) to solve problems ☐ Write a linear equation when given the graph of a line, two points on the line, or the slope and a point on the line ☐ Determine the slope and/or y-intercept represented by a linear equation or graph ☐ Draw, identify, find, and/or write an equation for a line of best fit for a scatter plot

Notes: