Abington Heights School District
Grade 7 Pre-Algebra Mathematics Curriculum

In Seventh Grade Pre-Algebra, students develop their numeracy skills through the following areas of study:

1. Ratios and Proportional Relationships
2. The Number System
3. Expressions and Equations
4. Geometry
5. Statistics and Probability

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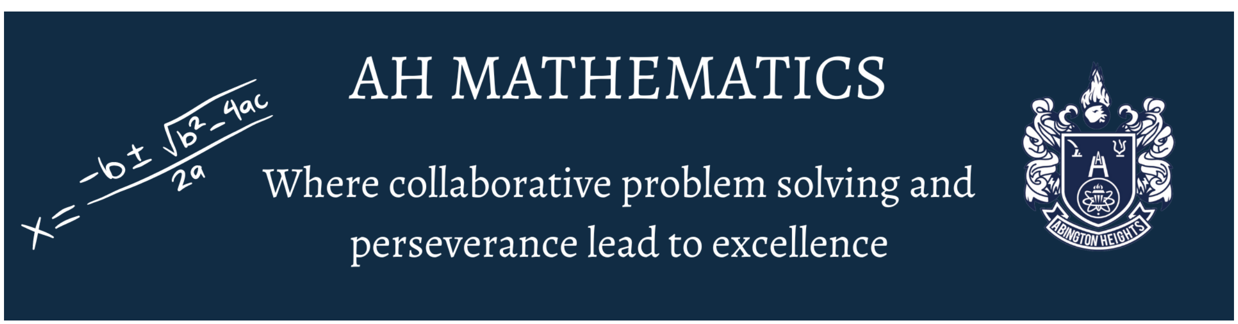

Abington Heights Math Framework

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 7 Pre-Algebra Mathematics Curriculum

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
Ratios and Proportional Relationships		
CC.2.1.7.D.1 Analyze proportional relationships and use them to model and solve real-world and mathematical problems.	M07.A-R.1.1.1 Compute unit rates associated with ratios of fractions, including ratios of lengths, areas, and other quantities measured in like or different units. Example: If a person walks 1/2 mile in each 1/4 hour, compute the unit rate as the complex fraction 1/2 / 1/4 miles per hour, equivalently 2 miles per hour. M07.A-R.1.1.2 Determine whether two quantities are proportionally related (e.g., by testing for equivalent ratios in a table, graphing on a coordinate plane and observing whether the graph is a straight line through the origin). M07.A-R.1.1.3 Identify the constant of proportionality (unit rate) in tables, graphs, equations, diagrams, and verbal descriptions of proportional relationships. M07.A-R.1.1.4 Represent proportional relationships by equations. Example: If total cost t is proportional to the number n of items purchased at a constant price p, the relationship between the total cost and the number of items can be expressed as t = pn. M07.A-R.1.1.5 Explain what a point (x, y) on the graph of a proportional relationship means in terms of the situation, with special attention to the points (0, 0) and (1, r), where r is the unit rate. M07.A-R.1.1.6 Use proportional relationships to	5.1, 5.2, Extension 5.2, 5.3, 5.4, 5.5, 5.6, 6.3, 6.4, 6.5, 6.6, 6.7

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
	solve multi-step ratio and percent problems. Examples: simple interest, tax, markups and markdowns, gratuities and commissions, fees, percent increase and decrease.	
The Number System		
CC.2.1.7.E.1 Apply and extend previous understandings of operations with fractions to operations with rational numbers.	M07.A-N.1.1.1 Apply properties of operations to add and subtract rational numbers, including real-world contexts. M07.A-N.1.1.2 Represent addition and subtraction on a horizontal or vertical number line. M07.A-N.1.1.3 Apply properties of operations to multiply and divide rational numbers, including real-world contexts; demonstrate that the decimal form of a rational number terminates or eventually repeats.	1.1, 1.2, 1.3, 1.4, 1.5, 2.1, 2.2, 2.3, 2.4
Expressions and Equations		
CC.2.2.7.B.1 Apply properties of operations to generate equivalent expressions.	M07.B-E.1.1.1 Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients. Example 1: The expression 1/2 • (x + 6) is equivalent to 1/2 • x + 3. Example 2: The expression 5.3 – y + 4.2 is equivalent to 9.5 – y (or – y + 9.5). Example 3: The expression 4w – 10 is equivalent to 2(2w – 5).	3.1, 3.2, Extension 3.2
CC.2.2.7.B.3 Model and solve real-world and mathematical problems by using and connecting numerical, algebraic, and/or graphical representations.	M07.B-E.2.1.1 Apply properties of operations to calculate with numbers in any form; convert between forms as appropriate. Example: If a woman making $25 an hour gets a 10% raise, she will make an additional 1/10 of her salary an hour, or $2.50, for a	3.3, 3.4, 3.5, 4.1, 4.2, 4.3, 4.4, 6.1, 6.2, 6.4

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
	new salary of $27.50 an hour (or 1.1 × $25 = $27.50). M07.B-E.2.2.1 Solve word problems leading to equations of the form px + q = r and p(x + q) = r, where p, q, and r are specific rational numbers. Example: The perimeter of a rectangle is 54 cm. Its length is 6 cm. What is its width? M07.B-E.2.2.2 Solve word problems leading to inequalities of the form px + q > r or px + q < r, where p, q, and r are specific rational numbers, and graph the solution set of the inequality. Example: A salesperson is paid $50 per week plus $3 per sale. This week she wants her pay to be at least $100. Write an inequality for the number of sales the salesperson needs to make and describe the solutions. M07.B-E.2.3.1 Determine the reasonableness of answer(s) or interpret the solution(s) in the context of the problem. Example: If you want to place a towel bar that is 9 3/4 inches long in the center of a door that is 27 1/2 inches wide, you will need to place the bar about 9 inches from each edge; this estimate can be used as a check on the exact computation. A1.1.1.4.1 Use estimation to solve problems.	
CC.2.2.8.B.1 Apply concepts of radicals and integer exponents to generate equivalent expressions.	M08.B-E.1.1.1 Apply one or more properties of integer exponents to generate equivalent numerical expressions without a calculator (with final answers expressed in exponential form with positive exponents). Properties will be provided. Example: 312 × 3 _15 = 3 _3 = 1/(33)	16.1, 16.2, 16.3, 16.4, 16.5, 16.6, 16.7

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
	M08.B-E.1.1.2 Use square root and cube root symbols to represent solutions to equations of the form x2= p and x3= p, where p is a positive rational number. Evaluate square roots of perfect squares (up to and including 122) and cube roots of perfect cubes (up to and including 53) without a calculator. Example: If x2 = 25 then x = ±√25. M08.B-E.1.1.3 Estimate very large or very small quantities by using numbers expressed in the form of a single digit times an integer power of 10 and express how many times larger or smaller one number is than another. Example:Estimate the population of the United States as 3 × 108 and the population of the world as 7 × 109 and determine that the world population is more than 20 times larger than the United States' population. M08.B-E.1.1.4 Perform operations with numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Express answers in scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading). Interpret scientific notation that has been generated by technology (e.g., interpret 4.7EE9 displayed on a calculator as 4.7 × 109). 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.	
Geometry		

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
CC.2.3.7.A.1 Solve real-world and mathematical problems involving angle measure, area, surface area, circumference, and volume.	M07.C-G.2.1.1 Identify and use properties of supplementary, complementary, and adjacent angles in a multistep problem to write and solve simple equations for an unknown angle in a figure. M07.C-G.2.1.2 Identify and use properties of angles formed when two parallel lines are cut by a transversal (e.g., angles may include alternate interior, alternate exterior, vertical, corresponding). M07.C-G.2.2.1 Find the area and circumference of a circle. Solve problems involving area and circumference of a circle(s). Formulas will be provided. M07.C-G.2.2.2 Solve real-world and mathematical problems involving area, volume, and surface area of two and three-dimensional objects composed of triangles, quadrilaterals, polygons, cubes, and right prisms. Formulas will be provided.	7.1, 7.2, Extension 7.3, 8.1, 8.2, 8.3, 9.2, 9.3, 9.4, 9.5
CC.2.3.7.A.2 Visualize and represent geometric figures and describe the relationships between them.	M07.C-G.1.1.1 Solve problems involving scale drawings of geometric figures, including finding length and area. M07.C-G.1.1.2 Identify or describe the properties of all types of triangles based on angle and side measures. M07.C-G.1.1.3 Use and apply the triangle inequality theorem. M07.C-G.1.1.4 Describe the two-dimensional figures that result from slicing three-dimensional figures. Example: Describe plane sections of right rectangular prisms and right rectangular pyramids	7.5

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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.1.1.2 Given two congruent figures, describe a sequence of transformations that exhibits the congruence between them. M08.C-G.1.1.3 Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates. M08.C-G.1.1.4 Given two similar two-dimensional figures, describe a sequence of transformations that exhibits the similarity between them.	12.1, 12.2, 12.3, 12.4
Statistics and Probability		
CC.2.4.7.B.1 Draw inferences about populations based on random sampling concepts.	M07.D-S.1.1.1 Determine whether a sample is a random sample given a real-world situation. M07.D-S.1.1.2 Use data from a random sample to draw inferences about a population with an unknown characteristic of interest. Example 1: Estimate the mean word length in a book by randomly sampling words from the book. Example 2: Predict the winner of a school election based on randomly sampled survey data.	10.6, Extension 10.6
CC.2.4.7.B.2 Draw informal comparative inferences about two populations.	M07.D-S.2.1.1 Compare two numerical data distributions using measures of center and variability. Example 1: The mean height of players on the basketball team is 10 cm greater than the mean height of players on the soccer team. This difference is equal to approximately twice the variability (mean	10.1, 10.2, 10.3, 10.7

PA Core Standards	PA Eligible Content	Big Ideas Mathematics Grade 7 Accelerated Lessons
	absolute deviation) on either team. On a line plot, note the difference between the two distributions of heights. Example 2: Decide whether the words in a chapter of a seventh-grade science book are generally longer than the words in a chapter of a fourth grade science book.	
CC.2.4.7.B.3 Investigate chance processes and develop, use, and evaluate probability models.	M07.D-S.3.1.1 Predict or determine whether some outcomes are certain, more likely, less likely, equally likely, or impossible (i.e., a probability near 0 indicates an unlikely event, a probability around 1/2 indicates an event that is neither unlikely nor likely, and a probability near 1 indicates a likely event). M07.D-S.3.2.1 Determine the probability of a chance event given relative frequency. Predict the approximate relative frequency given the probability. Example: When rolling a number cube 600 times, predict that a 3 or 6 would be rolled roughly 200 times but probably not exactly 200 times. M07.D-S.3.2.2 Find the probability of a simple event, including the probability of a simple event not occurring. Example: What is the probability of not rolling a 1 on a number cube? M07.D-S.3.2.3 Find probabilities of independent compound events using organized lists, tables, tree diagrams, and simulation. A1.2.3.3.1 Find probabilities for compound events (e.g., find probability of red and blue, find probability of red or blue) and represent as a fraction, decimal, or percent.	10.3, 10.4, 10.5, Extension 10.5

Portrait of an Abington Heights 7th Grade Mathematician

By the end of 7th Grade, students will:

The Number System	Ratios & Proportional Relationships	Expressions and Equations	Geometry	Statistics and Probability
☐ Apply and extend previous understanding of operations with fractions to add, subtract, multiply, and divide rational numbers, including in real-world contexts ☐ Represent addition and subtraction of rational numbers on horizontal and vertical number lines ☐ Demonstrate that the decimal form of a rational number terminates or eventually repeats	☐ Analyze proportional relationships and use them to solve real-world and mathematical problems ☐ Understand unit rates represented as a fraction with a denominator of 1 ☐ Recognize and represent proportional relationships between quantities ☐ Identify the constant of proportionality ☐ Represent proportional relationships as equations ☐ Use proportional relationships to solve multi-step ratio and percent problems	☐ Use properties of operations to generate equivalent expressions ☐ Apply properties of operations to add, subtract, factor, and expand linear expressions with rational coefficients ☐ Solve real-world mathematical problems using numerical and algebraic expressions and equations ☐ Solve multi-step problems using whole numbers, fractions, decimals, and percent ☐ Use variables to represent quantities in simple equations and inequalities	☐ Draw, construct, and describe geometric figures and the relationship between them ☐ Solve problems involving scale drawings of geometric figures ☐ Identify properties of triangles based on side and angle measures ☐ Use and apply triangle inequality theorem ☐ Describe two-dimensional figures that result from slicing three-dimensional figures ☐ Identify and use properties of supplementary, complementary, and adjacent angles ☐ Identify and use properties of angles formed when two parallel lines are cut by a transversal ☐ Find area and circumference of a circle ☐ Solve real-world and mathematical problems involving area, surface area, and volume	☐ Use random sampling to draw inferences about a population ☐ Draw informal comparative inferences about two populations ☐ Investigate chance processes and develop, use, and evaluate probability models ☐ Understand that probability is a number between 0 and 1, and can be represented as a fraction, decimal, or percent ☐ Find probabilities of simple events

Notes: