

Chambersburg Area School District Mathematic Curriculum
8th Grade Advanced Algebra I

Algebra I deepens and extends the understanding of linear and exponential relationships by contrasting them with each other and by applying linear models to data that exhibit a linear trend, and students engage in methods for analyzing, solving, and using quadratic functions.

Standards for Mathematical Practice

1. Make sense of problems and persevere in solving them.
2. Reason abstractly and quantitatively.
3. Construct viable arguments and critique the reasoning of others.
 4. Model with mathematics.
 5. Use appropriate tools strategically.
 6. Attend to precision.
 7. Look for and make use of structure.
8. Look for and makes sense of regularity in repeated reasoning.

Unit of Study	Unit 1: Integer Exponents, Roots, and Expressions	
Time Frame/Pacing	23 Days	
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools.	
Unit Essential Questions	• How is mathematics used to quantify, compare, represent, and model numbers? • How can mathematics support effective communication? • How are relationships represented mathematically? • How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? • What does it mean to estimate or analyze numerical quantities? • What makes a tool and/or strategy appropriate for a given task? • How can patterns be used to describe relationships in mathematical situations?	
PA Core Standards		PA Assessment Anchors
CC.2.1.8.E.1 CC.2.1.8.E.4 CC.2.2.8.F.1 CC.2.1.HS.F.1 CC.2.1.HS.F.2 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.HS.D.9 CC.2.2.HS.D.2 CC.2.2.HS.D.3 CC.2.2.HS.D.5 CC.2.2.HS.D.6		A1.1.1.1 A1.1.1.2 A1.1.1.3 A1.1.1.4 A1.1.1.5 A1.1.2.1 A1.1.2.2 A1.1.3.1 A1.1.3.2 A1.2.1.1
PA Eligible Content	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., $\sqrt{24} = 2\sqrt{6}$).	

	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. A1.1.1.4.1 Use estimation 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.												
Learning Objectives (Concepts Taught)	Students discern the structure of exponents by relating multiplication and division of expressions with the same base to combining like terms using the distributive property and by relating multiplying three factors using the associative property to raising a power to a power. Students verify that the properties of exponents developed in Lessons 2 and 3 remain true. Students work to prove the laws of exponents for all integer exponents. Students learn that irrational numbers exist and are different from rational numbers. Students learn to find positive square roots and cube roots of expressions and know that there is only one such number. Students learn that an irrational number is something quite different from other numbers they have studied before. They are infinite decimals that can only be expressed by a decimal approximation. Students explore the main functions that they will work with in Algebra I: linear, quadratic, and exponential. Students use the structure of expressions to define what it means for two algebraic expressions to be equivalent.												
Performance Objectives (Skills Demonstrated)	• Represent and/or use numbers in equivalent forms (integers, fractions, decimals, percents, square roots, exponents). • Apply and extend properties of exponents to solve problems with rational exponents • Apply number theory concepts to show relationships between real numbers in problem-solving settings. • Use exponents, roots, and/or absolute values to solve problems. • Perform arithmetic operations on polynomials.												
Key Vocabulary:	<table border="0"> <tr> <td>*Scientific Notation</td><td>Exponential Notation</td></tr> <tr> <td>Base, Exponent, Power</td><td>Integer</td></tr> <tr> <td>Equivalent Fractions</td><td>Square and Cube (of a number)</td></tr> <tr> <td>Expanded Form (of decimal numbers)</td><td>Whole Number</td></tr> <tr> <td></td><td>*Repeating Decimal Number</td></tr> <tr> <td></td><td>*Contained in PSSA Mathematics Glossary</td></tr> </table>	*Scientific Notation	Exponential Notation	Base, Exponent, Power	Integer	Equivalent Fractions	Square and Cube (of a number)	Expanded Form (of decimal numbers)	Whole Number		*Repeating Decimal Number		*Contained in PSSA Mathematics Glossary
*Scientific Notation	Exponential Notation												
Base, Exponent, Power	Integer												
Equivalent Fractions	Square and Cube (of a number)												
Expanded Form (of decimal numbers)	Whole Number												
	*Repeating Decimal Number												
	*Contained in PSSA Mathematics Glossary												
Assessments	Mid-Module Assessment End-of-Module Assessment												
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka 8th Module 1 Topic A Exponential Notation and Properties of Integer Exponents Lesson 1: Exponential Notation Lesson 2: Multiplication of Numbers in Exponential Form Lesson 3: Numbers in Exponential Form Raised to a Power Lesson 4: Numbers Raised to the Zeroth Power Lesson 5: Negative Exponents and the Laws of Exponents Lesson 6: Proofs of Laws of Exponents 8th Module 7 Topic A Square and Cube Roots Lesson 2: Square Roots Lesson 4: Simplifying Square Roots Lesson 5: Solving Equations with Radicals 8th Module 7 Topic B Decimal Expansion of Numbers Lesson 13: Comparing Irrational Numbers Algebra I Module 1 Topic A Introduction to Functions Studied this Year- Graphing Stories Lesson 1: Graphs of Piecewise Linear Functions Lesson 2: Graphs of Quadratic Functions Lesson 3: Graphs Exponential Functions												

	Lesson 4: Analyzing Graphs- Water Usage During a Typical Day at School Lesson 5: Two Graphing Stories Algebra I Module 1 Topic B The Structure of Expressions Lesson 6: Algebraic Expressions-The Distributive Property Lesson 7: Algebraic Expressions-The Commutative and Associative Properties Lesson 8: Adding and Subtracting Polynomials Lesson 9: Multiplying Polynomials
	Additional Supplemental Resources PTi3 Algebra 1 Unit 2 Cycle 1 Algebra 1 Unit 4 Cycle 1
Authentic Examples (real-world tasks)	Around the World of Scientific Notation
Visual Representations & Strategies	scientific calculator coordinate plane equations
Writing in Math	Grade 8 Item Sampler - Use item #5 as an open response without multiple choice items
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)

Unit of Study	Unit 2: One-Variable Equations & Inequalities					
Time Frame/Pacing	32 Days					
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Patterns exhibit relationships that can be extended, described, and generalized.					
Unit Essential Questions	• How is mathematics used to quantify, compare, represent, and model numbers? • How can mathematics support effective communication? • How are relationships represented mathematically? • How can expressions, equations and inequalities be used to quantify, solve, model and/or analyze mathematical situations? • What makes a tool and/or strategy appropriate for a given task?					
<table><tr><th>PA Core Standards</th><th>PA Assessment Anchors</th></tr><tr><td>CC.2.2.8.B.2 CC.2.2.7.B.3 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.8.B.3 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10</td><td>A1.1.1.4 A1.1.2.1 A1.1.2.2 A1.1.3.1 A1.1.3.2 A1.2.1.2</td></tr></table>			PA Core Standards	PA Assessment Anchors	CC.2.2.8.B.2 CC.2.2.7.B.3 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.8.B.3 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10	A1.1.1.4 A1.1.2.1 A1.1.2.2 A1.1.3.1 A1.1.3.2 A1.2.1.2
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PA Eligible Content	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. A1.1.3.1.1 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.					
Learning Objectives (Concepts Taught)	Students formalize descriptions of what they learned before (variable, solution sets, etc.) and are able to explain, justify, and evaluate their reasoning as they strategize methods for solving linear and nonlinear equations.					

Performance Objectives (Skills Demonstrated)	• Write, solve, and/or graph linear equations and inequalities using various methods. • Interpret solutions to linear equations and inequalities. • Use and/or identify algebraic properties. • Write, solve, and/or graph compound inequalities.
Key Vocabulary:	Basic Rigid Motion *Congruent Exterior Angle *Reflection Rotation Sequence (Composition) of Transformations *Transformation *Translation Transversal Vector Area and perimeter Parallel and perpendicular lines *Rotation Ray, line, line segment, angle supplementary, complementary, vertical and adjacent angles Triangle, quadrilateral *Similar *Pythagorean Theorem
Assessments	Mid-Module Assessment End-of-Module Assessment
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka Algebra I Module 1 Topic C Solving Equations and Inequalities Lesson 10: True and False Equations Lesson 11: Solution Sets for Equations and Inequalities Lesson 12: Solving Equations Lesson 13: Some Potential Dangers when Solving Equations Lesson 14: Solving Inequalities Lesson 15: Solution Sets of Two or More Equations (or inequalities) Joined by “And” or “Or” Lesson 16: Solving and Graphing Inequalities Joined by “And” or “Or” Lesson 17: Equations Involving Factored Expressions Lesson 18: Equations Involving a Variable Expression in the Denominator Big Ideas Purple Chapter 1 Section 3 extension Additional Supplemental Resources PTi3 Unit 3 Cycles 1 & 2 Big Ideas Purple Chapter 3 Section 4 extension
Authentic Examples (real-world tasks)	Compound Inequalities in Your World
Visual Representations & Strategies	Number Line Equations Inequalities
Writing in Math	PA Algebra Keystone Item Sampler 2018 (Use problem #14 A, B, and C-Module 1, p. 36)
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)

Unit of Study	Unit 3: Linear Equations, Inequalities, & Systems				
Time Frame/Pacing	32 Days				
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Patterns exhibit relationships that can be extended, described, and generalized.				
Unit Essential Questions	• How is mathematics used to quantify, compare, represent, and model numbers? • How can mathematics support effective communication? • How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations?				
<table border="1"> <thead> <tr> <th data-bbox="99 621 813 684">PA Core Standards</th><th data-bbox="813 621 1536 684">PA Assessment Anchors</th></tr> </thead> <tbody> <tr> <td data-bbox="99 684 813 1031"> CC.2.2.8.B.2 CC.2.2.7.B.3 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.8.B.3 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10 </td><td data-bbox="813 684 1536 1031"> A1.1.1.4 A1.1.2.1 A1.1.2.2 A1.1.3.1 A1.1.3.2 A1.2.1.2 </td></tr> </tbody> </table>		PA Core Standards	PA Assessment Anchors	CC.2.2.8.B.2 CC.2.2.7.B.3 CC.2.1.HS.F.3 CC.2.1.HS.F.4 CC.2.1.HS.F.5 CC.2.2.8.B.3 CC.2.2.HS.D.7 CC.2.2.HS.D.8 CC.2.2.HS.D.9 CC.2.2.HS.D.10	A1.1.1.4 A1.1.2.1 A1.1.2.2 A1.1.3.1 A1.1.3.2 A1.2.1.2
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PA Eligible Content	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. A1.1.3.1.3 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. 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.														
Learning Objectives (Concepts Taught)	Students generate graphs of linear equations in two variables first by completing a table of solutions and then by using information about slope and y-intercept. Students compare two different proportional relationships represented by graphs, tables, equations, or descriptions. Students compare the constant speed of two individuals to determine which has greater speed. Students graph simultaneous linear equations to find the point of intersection and then verify that the point of intersection is in fact a solution to each equation in the system. Students learn to solve systems of linear equations by substitution and elimination. Students apply their knowledge of systems to solve problems in real-world contexts. Students explain, justify, and evaluate their reasoning as they strategize methods for solving linear equations.														
Performance Objectives (Skills Demonstrated)	• Write, solve, and/or graph linear equations and inequalities using various methods. • Interpret solutions to linear equations and inequalities. • Interpret solutions to linear systems of equations and inequalities. • Write, solve, and/or graph systems of linear equations and inequalities using various methods. • Write and/or identify linear equations in various forms (slope-intercept, point-slope, standard, etc.).														
Key Vocabulary:	<table border="0"> <tr> <td>Equivalent Expressions</td><td>Inequality</td></tr> <tr> <td>Graph of an Equation in Two Variables</td><td>Linear Function</td></tr> <tr> <td>Solution</td><td>Properties of Equality</td></tr> <tr> <td>Solution Set</td><td>Properties of Inequality</td></tr> <tr> <td>Equation</td><td>Solve</td></tr> <tr> <td>Formula</td><td>System of Equations</td></tr> <tr> <td>Identity</td><td></td></tr> </table>	Equivalent Expressions	Inequality	Graph of an Equation in Two Variables	Linear Function	Solution	Properties of Equality	Solution Set	Properties of Inequality	Equation	Solve	Formula	System of Equations	Identity	
Equivalent Expressions	Inequality														
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Equation	Solve														
Formula	System of Equations														
Identity															
Assessments	Mid-Module Assessment End-of-Module Assessment														
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka 8th Module 4 Topic C Slope and Equations of Lines Lesson 15: The Slope of a Non-Vertical Line Lesson 16: The Computation of the Slope of a Non-Vertical Line Lesson 17: The Line Joining Two Distinct Points on the Graph $y = mx + b$ Has Slope m Lesson 18: There Is Only One Line Passing Through a Given Point with a Given Slope Lesson 19: The Graph of a Linear Equation in Two Variables is a Line Lesson 20: Every Line is a Graph of a Linear Equation Lesson 21: Some Facts about Graphs of Linear Equations in Two Variables Lesson 22: Constant Rates Revisited Lesson 23: The Defining Equation of a Line 8th Module 4 Topic D Systems of Linear Equations and Their Solutions Lesson 27: Nature of Solutions of a System of Linear Equations Lesson 28: Another Computational Method of Solving a Linear System Lesson 29: Word Problems Algebra I Module 1 Topic C Solving Equations and Inequalities Lesson 17: Equations Involving Factored Expressions Lesson 18: Equations Involving a Variable Expression in the Denominator Lesson 19: Rearranging Formulas Lesson 20: Solutions to Equations with Two Variables Lesson 21: Solutions to Inequalities with Two Variables Lesson 22-23: Solutions Sets to Simultaneous Equations Lesson 24: Applications to Systems of Equations and Inequalities														

	Additional Supplemental Resources PTi3 Unit 5 Cycles 1, 2, & 3	
Authentic Examples (real-world tasks)	2018 Item Sampler #7, 10 Eureka Lesson #1 Example Problem Discussion Problem, p. 484 Eureka Teacher's Edition Dan Meyers 3 Act Math Ditch Diggers Playing Catch Up Coin Counting	Estimation 180 3 Act Math Zipline Basketball Shots
Visual Representations & Strategies	Coordinate Plane Scientific Calculator desmos.com Graph Paper Straightedge	
Writing in Math	PA Algebra Keystone Item Sampler 2018 (Use problem #13 A and - Module 1, p. 22)	
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)	

Unit of Study	Unit 4: Data & Statistics	
Time Frame/Pacing	25 Days	
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Patterns exhibit relationships that can be extended, described, and generalized. Data can be modeled and used to make inferences.	
Unit Essential Questions	● In what ways are the mathematical attributes of objects or processes measured, calculated and/or interpreted? ● How precise do measurements and calculations need to be? ● How can patterns be used to describe relationships in mathematical situations? ● How can recognizing repetition or regularity assist in solving problems more efficiently? ● How can data be organized and represented to provide insight into the relationship between quantities? ● How does the type of data influence the choice of display? ● How can probability and data analysis be used to make predictions?	
PA Core Standards		PA Assessment Anchors
CC.2.4.7.B.3 CC.2.4.8.B.1 CC.2.4.HS.B.1 CC.2.4.HS.B.2 CC.2.4.HS.B.3 CC.2.4.HS.B.4 CC.2.4.HS.B.5 CC.2.4.HS.B.7		A1.2.1.1 A1.2.1.2 A1.2.2.2 A1.2.3.1 A1.2.3.2 A1.2.3.3
PA Eligible Content	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. A1.2.3.2.1 Estimate or calculate to make predictions based on a circle, line, bar graph, measure of central tendency, or other representation. 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. 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.	
Learning Objectives (Concepts Taught)	Students learn to interpret the probability of an event as the proportion of the time that the event will occur when a chance experiment is repeated many times. Students develop a set of tools for understanding and interpreting variability in data and begin to make more informed decisions from data. Students work with data distributions of various shapes, centers, and spreads. Students build on their experience with bivariate quantitative data; they expand their understanding of linear relationships by connecting the data distribution to a model and	

	informally assessing the selected model using residuals and residual plots. The possible association between two categorical variables is explored by using data summarized in a table to analyze differences in conditional relative frequencies.	
Performance Objectives (Skills Demonstrated)	- Analyze a set of data for a pattern, and represent the pattern with an algebraic rule and/or a graph. - Summarize, represent, and interpret single-variable data and two-variable data. - Use measures of dispersion to describe a set of data (range, quartiles, interquartile range). - Analyze and/or interpret data displays and/or use them to make predictions (circle graph, line graph, bar graph, box-and-whisker plot, stem-and-leaf plot, scatter plot). - Make inferences and justify conclusions based on sample surveys, experiments, and observational studies. - Calculate and/or make predictions based upon measures of central tendency. - Apply probability to practical situations, including compound events. - Recognize and evaluate random processes underlying statistical experiments. - Apply the rules of probability to compute probabilities of compound events in a uniform probability model.	
Key Vocabulary:	Chance experiment chance process event frequency of an event relative frequency population probability probability model probability simulation random sample sample sample space measures of center	measures of variability correlation coefficient interquartile range outlier scatter plot box plot data distribution mean mean absolute deviation median quartile variability
Assessments	Mid-Module Assessment End-of-Module Assessment	
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka 7th Grade Module 5 Lesson 4: Calculating Probabilities for Chance Experiments with Equally Likely Outcomes Lesson 5: Chance Experiments with Outcomes That Are Not Equally Likely Lesson 6: Using Tree Diagrams to Represent a Sample Space and to Calculate Probabilities Lesson 7: Calculating Probabilities of Compound Events Algebra I Module 2 Topic A Shapes and Centers of Distribution Lesson 1: Distributions and Their Shapes Lesson 2: Describing the Center of Distribution Lesson 3: Estimating Centers and Interpreting the Mean as a Balance Point Algebra I Module 2 Topic B Describing Variability and Comparing Distributions Lesson 4: Summarizing Deviation from the Mean Lesson 5: Measuring Variability for Symmetrical Distributions Lesson 6: Interpreting the Standard Deviation Lesson 7: Measuring Variability for Skewed Distributions (Interquartile Range) Lesson 8: Comparing Distributions Algebra I Module 2 Topic D Numerical Data on Two Variables Lessons 12-13: Relationships Between Two Numerical Variables Lesson 14: Modeling Relationships with a Line Lesson 15: Interpreting Residuals from a Line Lesson 16: More on Modeling Relationships with a Line Lessons 17-18: Analyzing Radicals	

	Lesson 19: Interpreting Correlation Lesson 20: Analyzing Data Collected on Two Variables Additional Supplemental Resources PTi3 Unit 10 Cycles 1, 2, & 3 Big Ideas Purple Chapter 10 sections 2 & 4 Chapter 12 Sections 5-8 Big Ideas Advanced 2 Chapter 15 Sections 1-5
Authentic Examples (real-world tasks)	Probability Task: Sitting Across from Each Other
Visual Representations & Strategies	desmos.com dot plots box plots histograms google sheets residual plot
Writing in Math	End-Of-Module Assessment #5a, b, c, d (pp. 228-229 in Teacher Edition)
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)

Unit of Study	Unit 5: Linear Functions	
Time Frame/Pacing	20 Days	
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated. Mathematical relationships can be represented as expressions, equations and inequalities in mathematical situations. Numerical quantities, calculations, and measurements can be estimated or analyzed by using appropriate strategies and tools. Patterns exhibit relationships that can be extended, described, and generalized. Mathematical relations and functions can be modeled through multiple representations and analysed to raise and answer questions.	
Unit Essential Questions	• How is mathematics used to quantify, compare, represent, and model numbers? • How are relationships represented mathematically? • How can expressions, equations and inequalities be used to quantify, solve, model, and/or analyze mathematical situations? • How can recognizing repetition or regularity assist in solving problems more efficiently? • How can patterns be used to describe relationships in mathematical situations? • How can data be organized and represented to provide insight into the relationship between quantities?	
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PA Eligible Content	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).	
Learning Objectives (Concepts Taught)	Students examine a graph and a table that demonstrate the nonlinear effect of gravity on a falling object. Constant rate is revisited as it applies to the concept of linear functions and proportionality in general. Students graph linear and nonlinear functions. Students explore arithmetic and geometric sequences as an introduction to the formal notation of functions. Students compare and contrast the rates of change of linear and exponential functions. Students examine the graphs of a variety of functions and learn to interpret those graphs using precise terminology to describe such key features as domain and range, intercepts, intervals.	

Performance Objectives (Skills Demonstrated)	- Define, evaluate, and compare functions. - Use the concept and notation of function to interpret and apply them in terms of their context. - Construct and compare linear, quadratic, and exponential models and solve problems. - Create a function and/or sequence that model relationships between two quantities. - Create and/or analyze functions using multiple representations (graph, table, and equation). - Create new functions from existing functions (transformations of graphs).	
Key Vocabulary:	equation form of a linear function function graph of a linear function linear equations nonlinear equation rate of change	average rate of change domain range solution solution set
Assessments	Mid-Module Assessment End-of-Module Assessment	
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka 8th Module 5 Topic A Functions Lesson 1: The Concept of a Function Lesson 2: Formal Definition of a Function Lesson 3: Linear Functions and Proportionality Lesson 4: More Examples of Functions Lesson 5: Graphs of Functions and Equations Lesson 6: Graphs of Linear Functions and Rate of Change Lesson 7: Comparing Linear Functions and Graphs Lesson 8: Graphs of Simple Nonlinear Functions Algebra I Module 3 Topic A Linear and Exponential Sequences Lesson 1: Integer Sequences - Should You Believe in Patterns? Lesson 3: Arithmetic and Geometric Sequences Algebra I Module 3 Topic B Functions and Their Graphs Lesson 8: Why Stay with Whole Numbers Lesson 9-10: Representing, Naming, and Evaluating Functions Lesson 11: The Graph of a Function Lesson 12: The Graph of the Equation $y = f(x)$ Lesson 13: Interpreting the Graph of a Function Additional Supplemental Resources PTi3 Unit 6 Cycles 1 & 2 Unit 7 Cycle 1 Unit 8 Cycle 1 Unit 9 Cycle 1 (focus on Linear)	
Authentic Examples (real-world tasks)	Representing Functions of Everyday Situations	
Visual Representations & Strategies	coordinate plane equations inequalities desmos.com	
Writing in Math	PA Algebra Keystone Item Sampler 2018 (Use problem #13 A, B C, and D-Module 2, p. 70)	
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)	

Unit of Study	Unit 6: Polynomial & Quadratic Expressions	
Time Frame/Pacing	15 Days	
Big Ideas	Mathematical relationships among numbers can be represented, compared, and communicated.. Patterns exhibit relationships that can be extended, described, and generalized.	
Unit Essential Questions	- How is mathematics used to quantify, compare, represent, and model numbers? - How can mathematics support effective communication?	
PA Core Standards		PA Assessment Anchors
CC.2.1.6.E.3 CC.2.2.HS.D.1 CC.2.2.HS.D.5 CC.2.2.HS.D.6		A1.1.1.2 A1.1.1.5
PA Eligible Content	A1.1.1.2.1 Find the Greatest Common Factor (GCF) and/or the Least Common Multiple (LCM) for sets of monomials. 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.	
Learning Objectives (Concepts Taught)	Students learn the definition of a polynomial and how to add, subtract, and multiply polynomials. Here, their work with multiplication is extended and connected to factoring polynomial expressions and solving basic polynomial equations. Students expand their understanding of the division of polynomial expressions to rewriting simple rational expressions in equivalent forms.	
Performance Objectives (Skills Demonstrated)	- Simplify/factor expressions involving polynomials. - Use polynomial identities. - Apply and extend previous understanding of arithmetic to algebraic expressions.	
Key Vocabulary:	factored form for a quadratic function quadratic function standard form for a quadratic function binomial coefficient factor power	quadratic algebraic expression arithmetic sequence coefficient of a monomial equivalent polynomial expressions standard form of a polynomial in one variable trinomial
Assessments	Mid-Module Assessment End-of-Module Assessment	
Resources and Differentiation Tools	PRIMARY RESOURCE: Eureka Algebra 1 Module 4 Topic A Quadratic Expressions, Equations, Functions, & Their Connection to Rectangles Lessons 1-2: Multiplying and Factoring Polynomial Expressions Lessons 3-4 Advanced Factoring Strategies for Quadratic Expressions Lesson 5: The Zero Product Property Algebra 2 Module 1 Topic C Solving and Applying Equations Lesson 22: Equivalent Rational Expressions Lesson 23: Comparing Rational Expressions Lesson 24: Multiplying and Dividing Rational Expressions Lesson 25: Adding and Subtracting Rational Expressions (optional)	

	Additional Supplemental Resources PTi3 Unit 6 Cycles 1 & 2 Unit 9 Cycle 1 (focus on Linear) Unit 11 Cycles 1 & 2 Big Ideas Purple Chapter 11 Sections 3 & 4
Authentic Examples (real-world tasks)	Sandbox Problem, p. 37 Opening Exercises Teacher Edition
Visual Representations & Strategies	graph paper coordinate plane equations desmos.com algebra tiles or lab gear
Writing in Math	The Donut Palace Problem, p. 36 #2 Teacher Edition
Culturally Responsive Activities	Culturally Responsive Activities (see pp. 3-9)