



Accelerated Algebra 1

Course Number: 2912

Course Level: Accelerated

Grade: 9

Time/Credit: 1 semester/ 83 minutes daily

Development Date: Fall 2025 - Spring 2026

Central Bucks School District
20 Welden Drive
Doylestown, PA 18901

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K – 12 Mathematics Program Learning Principles

Teaching and Learning Principles:

1. Teaching mathematics for understanding requires providing experiences that stimulate students' curiosity and build confidence in investigating, problem solving, and communicating (speaking, reading, writing, representing, and listening).
2. Differentiated instruction addresses student strengths, interests, and learning styles.
3. Instruction should be appropriately paced to make the curriculum accessible to all students.
4. High expectations with strong support from teachers, parents and administrators motivate all students to achieve excellence in mathematics.
5. To create new understanding, students must be actively engaged in learning experiences designed to connect to their prior knowledge.
6. Presenting new ideas within rich and meaningful contexts helps learners to transfer and use knowledge meaningfully.
7. Making connections both within and outside of school helps learners to transfer and use knowledge meaningfully.
8. The learning process is enhanced when new ideas are presented using manipulatives, computers, calculators, and real-time data collection devices.
9. Teacher collaboration and reflection enrich learning experiences for students.
10. Assessment is an ongoing process that guides instruction and monitors student progress to include mastery of mathematics content and higher-level thinking skills.

Documents Considered:

(2000). *Principles and Standards for School Mathematics*. Reston, VA: National Council of Teachers of Mathematics.

Kilpatrick, J., Swafford, J., & Findell, B. (2001). *Adding It Up: Helping Children Learn Mathematics*. Washington, DC: National Academy Press.

Marzano, R., & Pickering, D. (1997). *Dimensions of Learning*. Alexandria, VA: Association for Supervision and Curriculum Development; Aurora, CO: Mid-continent Regional Educational Laboratory.

Tomlinson, Carol Ann. (1999). *The Differentiated Classroom: Responding to the Needs of All Learners*. Alexandria, VA: Association for Supervision and Curriculum Development.

Zemelman, S., Daniels, H., & Hyde, A. (1998). *Best practice: New standards for teaching and learning in America's schools*. Portsmouth, NH: Heinemann.

Mathematics Program Enduring Understandings

Students will understand that:

The Nature of Mathematics

- Mathematics is a language of carefully defined terms and symbols.
- Mathematics is used to make informed decisions about problems in everyday life.

Numbers and Operations

- There are multiple representations for any number.
- Numbers are classified and compared within our number system.
- Depending on the situation, calculations may be done using mental math or paper-and-pencil calculations using a variety of mathematically sound algorithms.
- Estimates help determine the reasonableness of an answer.
- Expressions are simplified using a predetermined order of operations.

Measurement

- Measurements collected using any tools (except for counting) are estimates with an accepted level of error.
- All measurements consist of exactly three parts: number, unit, and precision.
- Changing one linear dimension in a figure with two or three dimensions will have a different effect on the figure's perimeter, circumference, area, or volume.

Geometry

- Points, lines, and planes are the building blocks of geometry.
- Each geometric figure has a specific naming convention.
- Logical thinking and critical reasoning skills are important aspects of problem solving.
- A shape's characteristics (dimensionality, side measures, angle measures, faces, edges, area, perimeter, and volume) are used for identification.
- Concepts of congruency and similarity are used to relate and compare 2 and 3- dimensional figures.

Algebraic Concepts

- Algebraic rules and properties determine how expressions are simplified and how equations are solved.
- Problems involving a constant rate of change can be modeled using proportional reasoning.
- Algebraic expressions, equations, inequalities, and functions (linear, absolute value, quadratic, polynomial, exponential, and logarithmic) are used to model relationships between quantities in real-world situations.

- Patterns and functions can be generalized and represented using verbal models, tables, equations, and graphs.
- Systems of equations are solved both graphically and algebraically and are used to model real-life problems.

Data Analysis and Probability

- Data is collected, organized, and displayed for analysis.
- Interpretations and predictions about data are influenced by the method that data is collected and displayed.
- Probability is used to make informed predictions and inferences.

Mathematics Program Essential Questions

The Nature of Mathematics

- What characteristics make mathematics a language?
- When is the correct solution not the answer to a problem?

Numbers and Operations

- How do you know that an answer is reasonable?
- Why are there different number systems?
- How do you determine when to calculate with pencil and paper, find an estimate, or use a calculator?
- What does it mean to be simplified?
- Is there more than one way to simplify an expression?

Measurement

- What does it mean to be accurate?
- How do you measure?
- How does changing a dimension affect a figure's length, area, and volume?

Geometry

- How are figures classified?
- How do you name a geometric figure and why are standard naming conventions important?
- Why are points, lines, and planes so important in Euclidean geometry?
- What do similarity and congruency statements tell you about polygons?

Algebraic Concepts

- What does solve mean?
- Is your solution always the appropriate answer to a problem?
- How do expressions and equations differ?
- What makes a relationship linear?
- How can a line be used to make predictions?
- When is it necessary to use a system of equations?
- Why would you represent a pattern/function in different ways?

Data Analysis and Probability

- What is the purpose of collecting data?
- How is data used or abused?
- How do we make predictions based on probability?

Accelerated Algebra 1 Overview

Desired Results

Course Description:

2812 Accelerated Algebra 1

This course is intended for college-bound students who have successfully completed Academic Math 8 and have demonstrated excellent mathematical ability. Algebra 1 extends previously learned arithmetic skills to expressions involving variables. Major topics include linear equations and inequalities in one and two variables, exponents and polynomials, factoring, quadratic equations, proportions, functions, radicals, rational expressions, and data analysis. Problem-solving applications, communication, and reasoning are emphasized throughout the course. Students in this class will take the Algebra 1 Keystone Exams.

Prerequisite: Academic Math 8 (A-, 90% or higher) and teacher recommendation.

Committee Members:

Jeff Lake, Melissa Greenberg, William Smith, Katie Marttila, Brian Novick

Course Grading: The final course grade is calculated as follows:

- Each marking period grade counts for 45% of the students' course grade.
- The final exam counts for 10% of the students' course grade.

Accelerated Algebra 1 Pacing Guide

Accelerated Algebra 1 Pacing Guide	
Course Overview	Days
Chapter 1 Solving Linear Equations	9
Chapter 2 Solving Linear Inequalities	7
Chapter 3 Graphing Linear Functions	10
Chapter 4 Writing Linear Functions	8
Chapter 5 Solving Systems of Linear Equations	10
Chapter 6 Exponential Functions and Sequences	5
Chapter 7 Polynomial Equations & Factoring	14
Chapter 9 Radicals	5
Chapter 11 Data Analysis and Displays	4
Interleaving Practice Format (IPF)	3
Keystone Review	3
Beginning of Year Activities/Review/Remediation	2
Flex Days – Field Trips, Snow Days, Half Days, Assemblies, School Activities, etc.	6
Final Exam and Review	4
Total Days	90

Chapter 1 – 9 Days Solving Linear Equations	
Properties, Order of Operations, Classifying Numbers, Simplifying Expressions Section 1.1: Solving Simple Equations Section 1.2: Solving Multi – Step Equations Section 1.3: Proportions & Measurements – increase rigor $\frac{x-1}{3} = \frac{2x-1}{-5}$ Section 1.4: Solving Equations with Variables on Both Sides	4
Intervention and Enrichment	.5
Summative Quiz	.5
Section 1.5: Solving Absolute Value Equations Section 1.6: Rewriting Equations & Formulas	2
Intervention and Enrichment; Review; Performance Task	1
Chapter 1 Summative Assessment	1

Interleaving Practice Format (IPF) #1	
Chapter 2 – 7 Days Solving Linear Inequalities	
Section 2.1: Writing & Graphing Inequalities Section 2.2: Solving Inequalities Using Addition or Subtraction Section 2.3: Solving Inequalities Using Multiplication or Division Section 2.4: Solving Multi – Step Inequalities	2
Intervention and Enrichment	.5
Summative Quiz	.5
Section 2.5: Solving Compound Inequalities Section 2.6: Solving Absolute Value Inequalities	2
Intervention and Enrichment; Review; Performance Task	1
Chapter 2 Summative Assessment	1

Interleaving Practice Format (IPF) #2	
Chapter 3 – 10 days Graphing Linear Functions	
Section 3.1: Functions Section 3.3: Linear Functions Section 3.4: Function Notation	3

Intervention and Enrichment	.5
Summative Quiz	.5
Section 3.5: Graphing Linear Equations in Standard Form (Table of Values, Intercepts) Section 3.6: Graphing Linear Equations in Slope – Intercept Form	4
Intervention and Enrichment; Review; Performance Task	1
Chapter 3 Summative Assessment	1

Interleaving Practice Format (IPF) -3	
Chapter 4 – 8 days Writing Linear Functions	
Section 4.1: Writing Equations in Slope – Intercept Form Supplement: Writing Equations in Standard form- including converting between forms Section 4.3: Writing Equations of Parallel & Perpendicular Lines	3
Intervention and Enrichment	.5
Summative Quiz	.5
Section 4.4: Scatter Plots & Lines of Fit Section 4.5: Analyzing Lines of Fit	2
Intervention and Enrichment; Review; Performance Task	1
Chapter 4 Summative Assessment	1

Interleaving Practice Format (IPF) - 4	
Chapter 5 – 10 days Solving Systems of Linear Equations	
Section 5.1: Solving Systems of Linear Equations by Graphing Section 5.2: Solving Systems of Linear Equations by Substitution Section 5.3: Solving Systems of Linear Equations by Elimination Section 5.4: Solving Special Systems of Linear Equations	5
Intervention and Enrichment	.5
Summative Quiz	.5
Section 5.6: Graphing Linear Inequalities in Two Variables Section 5.7: Systems of Linear Inequalities	2
Intervention and Enrichment; Review; Performance Task	1
Chapter 5 Summative Assessment	1

Interleaving Practice Format (IPF) - #5	
Chapter 6 – 5 days Exponents	
Section 6.1: Properties of Exponents Supplement: Scientific Notation	4
Intervention and Enrichment; Review; Performance Task	.5
Chapter 6 Summative Assessment	.5

Interleaving Practice Format (IPF) - #6	
Chapter 7 – 14 days Polynomial Equations & Factoring	
Section 7.1: Adding & Subtracting Polynomials Section 7.2: Multiplying & Dividing Polynomials Section 7.3: Special Products of Polynomials	3
Intervention and Enrichment	.5
Summative Quiz	.5
Section 7.4: Solving Polynomial Equations in Factored Form Supplement: Factoring by GCF Section 7.5: Factoring $x^2 + bx + c$ Supplement: Factoring by Grouping Section 7.6: Factoring $ax^2 + bx + c$ Section 7.7: Factoring Special Products Section 7.8: Factoring Polynomials Completely Supplement: Simplifying Rational Expressions	8
Intervention and Enrichment; Review; Performance Task	1
Chapter 7 Summative Assessment	1

Interleaving Practice Format (IPF) - #7	
Chapter 9 – 5 Days Solving Quadratic Equations	
Section 9.1: Properties of Radicals (Simplify; Simplify with limited variables) Section 9.1: Operations with Radicals Section 9.3: Solving Quadratic Equations Using Square Roots	4
Intervention and Enrichment; Review; Performance Task	.5
Chapter 9 Summative Quiz	.5

Interleaving Practice Format (IPF) -8	
Chapter 11 – 4 Days (9 possible days) Data Analysis & Displays and Standards-based Review	
Section 11.1: Measures of Center & Variation Section 11.2: Box – and – Whisker Plots Supplement: Reading All Types of Data Displays (bar graph, circle graph, histogram, stem and leaf) Supplement: Probability and Odds	4
Intervention and Enrichment (if time allows)	.5
Summative Quiz (if time allows)	.5

KEYSTONE REVIEW AND TESTING (5-7 DAYS)	
Keystone Review Days	3
Keystone Days	2-4

Chapter 11 – 4 Days (9 possible days) Data Analysis & Displays and Standards-based Review	
Section 11.4: Two – Way Tables (if time allows) Section 11.5: Two – Way Tables & Relative Frequencies(if time allows)	2
Intervention and Enrichment; Review; Performance Task	1
Quadratics Summative Assessment	1

End of Year Test – 3 days	
Review	3
Final Exam	1

Required and Supplementary Texts/Software

Math & YOU – Algebra 1: Concepts and Connections

ISBN: 979-8-88802-853-7

Larson, R., & Battaglia, P., & Big Ideas Learning. (2025). *Math & YOU: Algebra 1 – Concepts and Connections*. Erie, Pennsylvania: Big Ideas Learning

Calculator Recommendation

The secondary mathematics department of Central Bucks School District recognizes the use of calculators as a valuable tool for learning in the mathematics classroom. In certain advanced courses, graphing calculators with specific capabilities are important for daily classroom performance and are required for Advanced Placement tests. While no specific brands are endorsed, there are restrictions on the types of calculators allowed on certain classroom tests and final exams. Calculators that perform operations with variables, such as the TI-89, TI-92, and HP49G, will not be permitted on district final exams, even though they may be used on some nationwide tests. Teachers have discretion as to whether these calculators can be used for classroom-related purposes.

Chapter 1: Solving Linear Equations

Desired Results

Essential Questions:

- What does it mean to solve an equation?
- Why is it important to perform the same calculation to both sides of an equation?
- How can we use the properties of equality to solve and model real-world problems with one-step linear equations?
- How do we solve and model real-life problems using multi-step equations and inverse operations?
- How can ratios, rates, and unit conversions be used to solve real-world problems accurately and efficiently?
- How can we determine the number of solutions to an equation and apply strategies to solve equations with variables on both sides?
- How does choosing the correct level of accuracy affect the reliability of a solution in real-world contexts?
- How do we solve absolute value equations and determine whether they have one, two, or no solutions?
- How can we manipulate literal equations to isolate a variable and apply formulas to real-life problems?

Enduring Understandings:

Students will understand that...

- Solve simple and multi-step equations.
- Describe how to solve equations.
- Analyze the measurements used to solve a problem and judge the level of accuracy appropriate for the solution.
- Apply equation-solving techniques to solve real-life problems.

Knowledge:

Students will know...

Definitions for: linear equation in one variable, equivalent equation, ratio, proportion, rate, precision, accuracy, identity, absolute value equation, extraneous solution

Skills:

Students will be able to...

- Solve simple linear equations using addition, subtraction, multiplication, and division.
- Solve multi-step equations by applying inverse operations, the distributive property, and combining like terms.
- Use ratios, proportions, and unit conversions to solve measurement and real-world problems.
- Solve equations with variables on both sides and identify when equations have one, none, or infinitely many solutions.
- Solve absolute value equations and determine the number of possible solutions.
- Rewrite literal equations and formulas to isolate a specific variable and use them to solve problems.

Standards:

Algebra 1 Standard	Algebra 1 Standard Description	PA Keystone Algebra I Standards
CC.2.2.HS.D.7	Create and graph equations or inequalities to describe numbers or relationships	A1.1.2.1
CC.2.2.HS.D.8	Apply inverse operations to solve equations or formulas	A1.1.2.1
CC.2.2.HS.D.9	Use reasoning to solve equations and justify the method	A1.1.2.2
CC.2.2.HS.D.1	Interpret the structure of expressions	A1.1.2.1
CC.2.1.HS.F.3	Apply quantitative reasoning for units and scales	A1.1.2.1
CC.2.1.HS.F.4	Use units to guide multi-step solutions	A1.1.2.1
CC.2.1.HS.F.5	Choose appropriate accuracy	A1.1.2.2

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: Every Drop Counts, pg. 54 – 55
- STEM Performance Task: Dead Reckoning (Supplemental)
- Big Idea Tasks: Writing Equivalent Equations (Supplemental)

Acceptable evidence of learning other than Problem Solving Tasks:

Formative Assessment

- Big Ideas of the Chapter
- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications:

Summative Assessment

- Chapter 1 Common Assessment: Sections 1.1 – 1.6
 - Chapter 1 Quiz: Sections 1.1 – 1.3

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
1.1	Solving Simple Equations	- Write and solve one-step equations. - Use properties of equality. - Model real-life equations.	- CPA (Concrete–Representational–Abstract) - Think-Aloud Modeling - Real-World Context Problems - Exit Tickets
1.2	Solving Multi-Step Equations	- Apply distributive property and combine like terms. - Use multiple inverse operations. - Write and solve multi-step equations.	- Annotated Modeling - Graphic Organizers - Error Analysis - Collaborative Problem Solving

1.3	Proportions and Measurements	- Use ratios, rates, and unit conversions. - Choose appropriate measurement accuracy. - Solve real-life proportional problems.	- Real-World Tasks - Card Sorts - Measurement Labs - Think-Pair-Share
1.4	Equations with Variables on Both Sides	- Solve equations with variables on both sides. - Identify number of solutions.	- Matching Activities - Error Analysis - Sentence Starters - Math Journaling
1.5	Solving Absolute Value Equations	- Solve absolute value equations. - Identify special solutions. - Interpret and write compound equations.	- Visual Modeling - Graphic Organizers - Error Analysis - Technology (Desmos/GeoGebra)
1.6	Rewriting Equations and Formulas	- Rearrange literal equations. - Apply rewritten formulas to real-life problems. - Solve for a specified variable.	- Think-Alouds - Exit Tickets - Real-Life Applications

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
 - Skill Builder Quick Check
- Tier 3:
 - Skills Foundation to support skill development
 - Skills Foundation Quick Check
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment
- Additional Topics & Lessons that go beyond the standard curriculum

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 2: Solving Linear Inequalities

Desired Results

Essential Questions:

- How can inequalities represent real-world situations?
- What are different ways to show the solution of an inequality?
- When might inequalities be more useful than equations?
- Why do rules for solving inequalities differ slightly from solving equations?
- How does multiplication or division of an inequality affect the direction of the inequality?
- How can we solve inequalities that require more than one step?
- What does it mean to have a solution for a compound inequality?
- How are compound inequalities used in real-life scenarios?
- How do we interpret and solve absolute value inequalities?
- What is the relationship between absolute value inequalities and compound inequalities?

Enduring Understandings:

Students will understand that...

- Solving inequalities requires understanding the properties of inequalities and how they differ from equations.
- Solutions to inequalities can be represented and interpreted in multiple ways including number lines, graphs, and real-world applications.
- Inequalities allow us to model and solve problems where a range of values is acceptable rather than a single solution.
- Understanding compound and absolute value inequalities expands the ability to represent complex relationships and constraints in problem-solving.

Knowledge:

Students will know...

Definitions for: inequality, solution of inequality, solution set, graph of an inequality, equivalent, inequalities, compound inequality, absolute value inequality, bounded interval, unbounded interval, absolute deviation

Skills:

Students will be able to...

2.1 Writing and Graphing Inequalities

- Translate verbal descriptions into inequalities.
- Identify solutions to inequalities.
- Graph and interpret simple inequalities.

2.2 Solving Inequalities Using Addition or Subtraction

- Apply properties of inequalities to isolate variables.
- Solve inequalities using inverse operations.
- Model situations with addition or subtraction inequalities.

2.3 Solving Inequalities Using Multiplication or Division

- Solve one-step inequalities involving multiplication or division.
- Interpret the effects of multiplying/dividing by a negative number.
- Represent real-life contexts with multiplicative/divisional inequalities.

2.4 Solving Multi-Step Inequalities

- Combine properties of inequality to solve complex expressions.
- Break down and solve inequalities with more than one operation.
- Apply real-life contexts to multi-step inequality models.

2.5 Solving Compound Inequalities

- Solve and graph conjunction and disjunction inequalities.
- Interpret compound inequalities in context.
- Represent solution sets on number lines.

2.6 Solving Absolute Value Inequalities

- Rewrite absolute value inequalities as compound inequalities.
- Solve and graph absolute value inequality solutions.
- Apply absolute value concepts to real-world scenarios.

Standards:

Algebra 1 Standard Code	Algebra 1 Standard Description	PA Keystone Algebra I Standards
CC.2.2.HS.D.7	Create and graph equations or inequalities	A1.1.2.1
CC.2.2.HS.D.8	Apply inverse operations	A1.1.2.1
CC.2.2.HS.D.1	Interpret structure of expressions	A1.1.2.1

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: Summitting Everest, pg. 104 – 105
- STEM Performance Task: Planning Electrical Circuits (Supplemental)
- Big Idea Tasks: Achieving a Goal (Supplemental)
- Big Idea Tasks: Connecting Inequalities to Circumference. (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & exit slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Formative Quizzes
- Online Applications

Summative Assessment

- Chapter 2 Common Assessment: Sections 2.1 – 2.6

Chapter 2 Quiz: Sections 2.1 – 2.4

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
2.1	Writing and Graphing Inequalities	Write word sentences as inequalities Graph and interpret inequalities Determine solutions on number lines	CPA models using number lines Word problem matching activities Visual demonstrations with inequality rulers Real-life inequality examples Guided group practice
2.2	Solving with Addition or Subtraction	Apply properties of inequality (add/subtract) Solve one-step inequalities Create models from word problems	Interactive notebooks with addition/subtraction rules Online graphing tools Peer teaching stations Number line games Scaffolded worksheet progressions
2.3	Solving with Multiplication or Division	Apply multiplication/division rules, including direction changes Solve inequalities using multiplication/division Model with real-world examples	Demonstration with inequality flip cards Error analysis on solving steps Technology-based graphing simulations Real-world word problem analysis Think-Pair-Share to test direction rules

2.4	Solving Multi-Step Inequalities	Use multiple steps to isolate variables Apply inverse operations in order Solve and model multi-step contexts	Math talk on solution strategies Partner puzzle matching for steps Scaffolded problem sequencing Problem-based learning with budgets or constraints Desmos activities for exploration
2.5	Solving Compound Inequalities	Recognize and solve compound inequalities Graph solutions and interpret them Translate real-life scenarios into compound models	Compound inequality card sorts Digital graph modeling Matching graphs to verbal contexts Create-your-own inequality stations Real-world compound scenario journals
2.6	Solving Absolute Value Inequalities	Translate absolute value into compound inequalities Solve and check absolute value solutions Model and apply to real-world scenarios	Absolute value foldables Interactive Desmos sliders Real-world problems (tolerance/range limits) Exit ticket checks with error corrections Think-aloud modeling of structure

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.

- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 3: Graphing Linear Functions

Desired Results

Essential Questions:

- What is a function, and how can you determine whether a relation is a function?
- How can you describe the behavior and characteristics of a function using a graph?
- How can function notation be used to describe and interpret mathematical relationships?
- How do slope and intercepts influence the graph of a linear equation in standard and slope-intercept form?

Enduring Understandings:

Students will understand that...

- Students will understand that a function represents a relationship between quantities that can be described and analyzed using graphs, tables, and equations.
- Students will understand that linear functions model real-world relationships and can be graphed in multiple forms using slope and intercepts.
- Students will understand that function notation provides a way to represent, evaluate, and communicate mathematical relationships clearly.

Knowledge:

Students will know...

Definitions for: relation, function, domain, range, independent variable, dependent variable, x-intercept, y-intercept, increasing, decreasing, linear function, solution of a linear equation in two variables, discrete domain, continuous domain, function notation, standard form, slope, rise, run, slope-intercept form, constant function

Skills:

Students will be able to...

- Determine if a relation is a function and identify domain and range.
- Describe characteristics of graphs and sketch them from verbal descriptions.
- Identify, interpret, and graph linear functions in various forms.
- Evaluate and interpret functions using function notation.
- Find slope and graph lines in standard and slope-intercept forms.

Standards:

Algebra 1 Standard Code	Algebra 1 Standard Description	PA Keystone Algebra I Standards
CC.2.2.HS.C.6	Interpret functions in context	A1.2.1.1
CC.2.2.HS.D.7	Create and graph equations or inequalities	A1.1.2.1 A1.1.3.1
CC.2.2.HS.D.1	Interpret expressions	A1.1.1.5
CC.2.2.HS.D.10	Represent and solve systems	A1.1.3.2
CC.2.1.HS.F.6	Apply arithmetic to complex numbers	A1.4.2.2
CC.2.1.HS.F.7	Apply complex numbers to quadratics	A1.4.2.2

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: Into the Deep, pg. 176 – 177
- STEM Performance Task: Speed of Light (Supplemental)
- Big Idea Tasks: Identifying a Function (Supplemental)
- Big Idea Tasks: Understanding a Linear Function (Supplemental)
- Big Idea Tasks: Using Function Notation (Supplemental)
- Big Idea Tasks: Finding the Area of a Trapezoid in the Coordinate Plane (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 3 Common Assessment: Sections 3.1, 3.3, 3.4, 3.5, 3.6
 - Chapter 3 Quiz: Sections 3.1, 3.2, 3.4

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
3.1	Functions	- Determine whether a relation is a function - Find domain and range - Identify dependent and independent variables	- Use mapping diagrams and tables - Card sort activity for function vs non-function - Graph simple functions on Desmos - CPA using input/output machines - Real-life relation examples (e.g., vending machine)
3.3	Linear Functions	- Identify linear functions from graphs/tables/equations - Graph linear functions - Create and interpret real-world linear models	- Graphing paper and slope triangles - Table-to-graph practice - Function machine simulations - Graphing challenges with real-life data - Gallery walk of different representations
3.4	Function Notation	- Evaluate functions using notation - Interpret functional statements - Graph from function notation expressions	- Interactive notebooks for notation practice - Function matching card games - Create-your-own function notation mini-poster - Technology-based evaluation (e.g., Desmos sliders)

			- CPA examples using notation
3.5	Graphing in Standard Form	- Graph horizontal/vertical lines - Graph standard form using intercepts - Solve problems modeled by standard form equations	- Anchor chart for intercept method - Guided practice with intercept finding - Use graphing calculator to verify graphs - Hands-on whiteboard graphing - Real-life examples like budgeting equations
3.6	Slope-Intercept Form	- Find slope from graph or points - Graph using slope-intercept form - Model real-world linear relationships	- Slope foldable with guided notes - Interactive slope race activity - Real-world graphs (e.g., distance over time) - Use of color-coded graphing practice - Desmos linear function challenges

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 4: Writing Linear Functions

Desired Results

Essential Questions:

- How can linear functions model relationships between two variables in real-world situations?
- What information is needed to write an equation of a line?
- How do changes in slope and intercept affect the graph and equation of a line?
- In what ways can data trends be interpreted and predicted using lines of fit?

Enduring Understandings:

Students will understand that...

- Linear functions can be used to model and solve problems involving constant rates of change.
- Equations of lines can be written in various forms depending on the information provided.
- Scatter plots and lines of best fit can help interpret data and make predictions.

Knowledge:

Students will know...

Definitions for: linear model, point-slope form, parallel lines, perpendicular lines, scatter plot, correlation, causation, line of fit, linear regression, line of best fit, interpolation, extrapolation

Skills:

Students will be able to...

- Write equations in slope-intercept and point-slope form.
- Recognize and write equations of parallel and perpendicular lines.
- Interpret and analyze scatter plots and lines of fit.

Standards:

Algebra 1 Standard	Algebra 1 Description	PA Keystone Algebra I Standards
CC.2.2.HS.D.7	Create and graph equations or inequalities	A1.1.2.1 A1.1.3.1
CC.2.2.HS.D.4	Write the zeros of a polynomial function and use them to sketch the graph of the function	A1.4.1.2

CC.2.2.HS.D.5	Use polynomial identities to solve problems	A1.4.2.1
CC.2.2.HS.D.6	Rewrite rational expressions in different forms	A1.1.1.5
CC.2.2.HS.C.2	Graph functions expressed symbolically and show key features of the graph	A1.4.1.2
CC.2.2.HS.C.5	Construct and compare linear, quadratic, and exponential models	A1.5.1.2
CC.2.2.HS.C.6	Interpret the parameters in a linear or exponential function in terms of a context	A1.5.1.1
CC.2.2.HS.C.1	Use function notation and interpret statements in terms of a context	A1.1.2.1
CC.2.2.HS.D.1	Interpret the structure of expressions	A1.1.2.1

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: This One's a Breeze, pg. 234 – 235
- STEM Performance Task: Future Wind Power (Supplemental)
- Big Idea Tasks: Analyzing Lines of Fit (Supplemental)
- Big Idea Tasks: Writing Functions (Supplemental)
- Big Idea Tasks: Comparing Memberships (Supplemental)
- Big Idea Tasks: Stacking Firewood (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 4 Common Assessment: Sections 4.1 – 4.5
 - Chapter 4 Quiz: Sections 4.1 – 4.3

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
4.1	Writing Equations in Slope-Intercept Form	- Find slope and y-intercept of a line - Write equations using slope-intercept form - Solve real-life problems using linear equations	- Use of real-world application scenarios - Graphing calculators or Desmos for visual understanding - Concrete-pictorial-abstract (CPA) approach - Collaborative group work and peer discussion - Use of technology and data analysis tools
4.2	Writing Equations in Point-Slope Form	- Use slope and a point to write an equation - Write equations using two given points - Apply point-slope form to real-life contexts	- Use of real-world application scenarios - Graphing calculators or Desmos for visual understanding - Concrete-pictorial-abstract (CPA) approach - Collaborative group work and peer discussion - Use of technology and data analysis tools
4.3	Parallel and Perpendicular Lines	- Identify parallel and perpendicular lines - Write equations for parallel lines - Write equations for perpendicular lines	- Use of real-world application scenarios - Graphing calculators or Desmos for visual understanding - Concrete-pictorial-abstract (CPA) approach - Collaborative group work and peer discussion - Use of technology and data analysis tools
4.4	Scatter Plots and Lines of Fit	- Read and interpret scatter plots - Determine correlation and causation - Write and	- Use of real-world application scenarios - Graphing calculators or Desmos for visual understanding - Concrete-pictorial-abstract (CPA) approach - Collaborative group work and peer discussion

		interpret lines of fit	- Use of technology and data analysis tools
4.5	Analyzing Lines of Fit	- Use technology to find lines of best fit - Analyze fit using residuals - Solve real-life problems using best fit lines	- Use of real-world application scenarios - Graphing calculators or Desmos for visual understanding - Concrete-pictorial-abstract (CPA) approach - Collaborative group work and peer discussion - Use of technology and data analysis tools

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.

- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 5: Solving Systems of Linear Equations

Desired Results

Essential Questions:

- How can systems of linear equations be used to model and solve real-world problems?
- What methods can be used to solve a system of equations, and how do we decide which is most efficient?
- What does the solution to a system of equations represent in context?
- How can you determine the number of solutions a system of equations or inequalities has?

Enduring Understandings:

Students will understand that...

- Systems of linear equations can be solved using multiple methods including graphing, substitution, and elimination.
- The most efficient method of solving a system depends on the specific form of the equations.
- Systems of equations can have one solution, no solution, or infinitely many solutions, and these represent real-world contexts.
- Graphing inequalities and systems of inequalities helps visualize solutions and constraints in real-world scenarios.

Knowledge:

Students will know...

Definitions for: systems of linear equations, solution of a system of linear equations, linear inequality in two variables, solution of a linear inequality in two variables, graph of a linear inequality, half-planes, system of linear inequalities, solution of a system of linear inequalities, graph of a system of linear inequalities

Skills:

Students will be able to...

- Solve systems of equations by graphing, substitution, and elimination.
- Determine the number of solutions to a system of equations or inequalities.
- Graph linear inequalities and systems of inequalities.
- Apply systems of equations and inequalities to solve real-life problems.
- Interpret the solution of a system of equations and inequalities from graphs.

Standards:

Algebra 1 Standard	Algebra 1 Description	PA Keystone Algebra I Standards
CC.2.2.HS.D.7	Create and graph equations or inequalities	A1.1.2.1
CC.2.2.HS.D.9	Use reasoning to solve equations and justify the method	A1.1.2.2
CC.2.2.HS.D.10	Represent and solve systems of equations and inequalities	A1.1.3.2

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: A Challenging Descent, pg. 286 – 287
- STEM Performance Task: Setting Fishery Limits (Supplemental)
- Big Idea Tasks: Writing A System of Linear Equations (Supplemental)
- Big Idea Tasks: Solving Systems of Linear Equations (Supplemental)
- Big Idea Tasks: Solving a Special System of Linear Equations (Supplemental)
- Big Idea Tasks: Withdrawing Money from the Bank (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 5 Common Assessment: Sections 5.1 – 5.4, 5.6 – 5.7
 - Chapter 5 Quiz: Sections 5.1 – 5.4

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
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5.1	Solving Systems by Graphing	• Determine if an ordered pair is a solution to a system • Graph linear systems • Approximate solutions graphically	• Graphing calculators or Desmos • CPA: Tables → Graphs → Equations • Partner pair-ups to compare solutions • Use of real-world contexts like budgeting or speed/time problems
5.2	Solving Systems by Substitution	• Substitute one equation into another • Solve resulting equations • Interpret real-world substitution solutions	• Worked examples with color-coding • Interactive notebooks • Algebra tiles (CPA) • Substitution scavenger hunt activity
5.3	Solving Systems by Elimination	• Align and manipulate equations • Add or subtract to eliminate a variable • Solve real-world elimination problems	• Real-world shopping scenarios • Elimination domino cards • CPA using integer chips • Elimination matching games
5.4	Solving Special Systems	• Classify systems (one, none, infinite solutions) • Interpret solutions algebraically and graphically • Identify consistent/inconsistent systems	• Card sort for types of systems • Graphical software or apps • Use of number lines for modeling solutions • Think-pair-share for different solution scenarios
5.5	Solving Equations by Graphing	• Graph both sides of equations • Find the point of intersection • Interpret absolute value graph solutions	• Desmos activities • Graph & compare approach • Technology-based practice • Anchor chart on solution meanings
5.6	Graphing Linear Inequalities	• Determine if a point satisfies an inequality • Graph linear inequalities • Model real-life constraints	• Use of shading and boundary line games • CPA with inequality tiles • Desmos graphing tool • Interactive flipbooks
5.7	Systems of Linear	• Graph systems of inequalities	• Real-world business models • Graphing games (color-by-

	Inequalities	• Identify solutions to systems graphically • Write systems from shaded regions	region) • Tech integration: Geogebra or Desmos • Mini-projects: planning within constraints
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Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 6: Exponents

Desired Results

Essential Questions:

- How can properties of exponents be applied to simplify expressions and solve problems?
- In what ways can exponential functions model real-world phenomena?
- In what ways can scientific notation model real-world numbers?

Enduring Understanding:

Students will understand that...

- Students will understand that properties of exponents allow simplification and interpretation of expressions with powers.
- Students will understand that scientific notation can be used to model extreme numbers.

Knowledge:

Students will know...

- Definitions for: exponent, base, polynomial, area, scientific notation
- How to apply properties of exponents: multiplying monomials with the same base, raising a power to a power, dividing monomials, power of a product (including zero and negative exponents)
- Formulas:
 - Product of Powers Property $a^m \cdot a^n = a^{m+n}$
 - Power of a Power Property $(a^m)^n = a^{mn}$
 - Power of a Product Property $(ab)^m = a^m b^m$
 - Negative Exponent Property $a^{-m} = \frac{1}{a^m}, a \neq 0$
 - Zero Exponent Property $a^0 = 1, a \neq 0$
 - Quotient of Powers Property $\frac{a^m}{a^n} = a^{m-n}, a \neq 0$
 - Power of a Quotient Property $\left(\frac{a}{b}\right)^m = \frac{a^m}{b^m}, b \neq 0$

Skills:

Students will be able to...

- Simplify expressions involving exponents.
- Find the area of geometric shapes.
- Convert numbers between scientific notation and standard forms.
- Multiply and divide numbers in scientific notation and solve scientific notation word problems.

Standards:

Algebra 1 Standard	Algebra 1 Description	PA Keystone Algebra I Standards
CC.2.1.HS.F.1	Apply and extend the properties of exponents to solve problems with rational exponents.	A1.1.1.2
CC.2.2.7.B.1	Apply properties of operations to generate equivalent expressions.	A1.1.1.2

Acceptable Evidence**Problem Solving Tasks:**

- Big Idea Tasks: Understanding Exponential Expressions (Supplemental)
- Big Idea Tasks: Using Properties of Exponents (Supplemental)

Acceptable evidence of learning other than Performance Tasks:**Formative Assessment**

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 6 Common Assessment: Sections 6.1, Supp. Scientific Notation

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
6.1	Properties of Exponents	• Explain and apply zero and negative exponents. • Simplify expressions using exponent rules. • Evaluate numerical expressions with exponents.	• Use base-ten blocks to visualize exponent patterns (CPA). • Create foldables for exponent rules. • Use online exponent calculators and simulations. • Problem-based learning with exponent puzzles. • Exit tickets focusing on simplifying expressions.
Supplement	Scientific Notation	• Convert between scientific notation and standard form	• Problem-based learning with scientific notation puzzles. • Exit tickets focusing on scientific notation expressions.

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 7: Polynomial Equations and Factoring

Desired Results

Essential Questions:

- How can we classify and manipulate polynomials to model real-world scenarios?
- What methods can be used to simplify and solve polynomial expressions and equations?
- How does factoring help us solve polynomial equations and understand the structure of algebraic expressions?
- Why are special products and factoring patterns important in simplifying and solving polynomial equations?

Enduring Understandings:

Students will understand that...

- Polynomials can be classified, added, subtracted, multiplied, and factored to model and solve mathematical and real-life problems.
- Factoring is a critical skill for solving polynomial equations and interpreting algebraic expressions.
- Recognizing patterns in polynomials allows for efficient problem-solving and deeper conceptual understanding.
- Polynomial operations extend foundational algebra skills and are essential for higher-level mathematics.

Knowledge:

Students will know...

Definitions for: monomial, degree of a monomial, polynomial, binomial, trinomial, degree of a polynomial, standard form, leading coefficient, closed, FOIL Method, factored form of an equation, Zero-Product Property, roots, factored form of a polynomial, factoring by grouping, factored completely

Skills:

Students will be able to...

- Classify polynomials by degree and number of terms.
- Add and subtract polynomials.
- Multiply and divide polynomials using various methods (Distributive Property, FOIL).

- Recognize and apply special product patterns.
- Factor polynomials using GCF, grouping, and other methods.
- Solve polynomial equations by factoring.
- Apply factoring skills to real-life problem contexts.

Standards:

Algebra 1 Standard	Algebra 1 Description	PA Keystone Algebra I Standards
CC.2.2.HS.D.1	Interpret the structure of expressions	A1.1.1.1
CC.2.2.HS.D.2	Write equivalent expressions	A1.1.1.2
CC.2.2.HS.D.3	Perform arithmetic operations on polynomials	A1.1.1.3
CC.2.2.HS.D.6	Rewrite rational expressions	A1.1.1.2
CC.2.2.HS.D.7	Create and graph equations or inequalities	A1.1.2.1
CC.2.2.HS.D.8	Solve for a variable in terms of other variables	A1.1.1.2

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: Gravity Check, pg. 410 – 411
- STEM Performance Task: Birds Dropping Food (Supplemental)
- Big Idea Tasks: Understanding Polynomials (Supplemental)
- Big Idea Tasks: Writing a Polynomial (Supplemental)
- Big Idea Tasks: Factoring a Polynomial (Supplemental)
- Big Idea Tasks: Factoring Polynomials Completely (Supplemental)
- Big Idea Tasks: Finding the Volume of a Box (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote

- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 7 Common Assessment: Sections 7.1 – 7.8, Supp. Simplifying Rational Expressions
 - Chapter 7 Quiz: Sections 7.1 – 7.4

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Topic	Learning Targets	Instructional Strategies
7.1	Adding and Subtracting Polynomials	- Classify polynomials by degree and terms - Add and subtract polynomial expressions - Apply to real-life examples	- CPA approach (use algebra tiles) - Interactive notebooks for organizing polynomial terms - Real-world modeling tasks - Guided practice with error analysis
7.2	Multiplying and Dividing Polynomials	- Multiply/divide polynomials by monomials - Multiply binomials using Distributive Property and FOIL - Multiply trinomials	- Foldables to show FOIL patterns - Use of visual diagrams and area models - Practice with digital algebra tools - Real-life problem-solving applications
7.3	Special Products of Polynomials	- Apply square of binomial pattern - Use sum and difference pattern - Solve problems using special products	- Pattern discovery via manipulatives - Color-coding pattern components - Problem sets that model financial growth or physics applications - Peer teaching
7.4	Solving Polynomial Equations in Factored Form	- Apply Zero Product Property - Factor using GCF - Solve polynomial equations using factoring	- Solve & discuss with vertical whiteboards - Use of flow maps for factoring process - CPA progression to abstract solving - Real-life algebra-based scenarios

7.5	Factoring x^2+bx+c	- Factor simple quadratics - Identify binomial pairs that produce the middle and last terms	- Use of puzzle-style factoring grids - Number bond practice to build understanding - Think-pair-share on choosing factor pairs - Mini-whiteboard practice
7.6	Factoring ax^2+bx+c	- Apply GCF first - Factor with $a \neq 1$ using box or grouping method - Justify binomial factor choices	- Graphic organizers for trial factoring - Box method visuals - Factoring relay races - Scaffolded problem breakdown
7.7	Factoring Special Products	- Recognize and factor difference of squares - Identify perfect square trinomials - Apply to real-life situations	- Gallery walk for pattern spotting - Practice with color-coded examples - Case studies (e.g., area and finance problems) - Matching cards for factoring types
7.8	Factoring Polynomials Completely	- Factor using multiple strategies - Recognize combinations of factoring techniques - Solve real-world problems using full factoring	- Strategy sort cards - Structured choice practice (students select method) - Digital interactive factoring explorations - Real-world word problems

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice

- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
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 - Application practice
 - Enrichment projects

Central Bucks School District – Course of Study

Chapter 9: Radicals

Desired Results

Essential Questions:

- Why should radical expressions be simplified?
- How do you know when a radical expression is simplified?
- How can radical expressions be simplified and applied to solve problems?
- What are the different strategies for solving quadratic equations, and when is each most effective?

Enduring Understandings:

Students will understand that...

- Radicals need to be represented in simplest form.
- Radicals can be combined using addition, subtraction, multiplication and division.
- Radical expressions can be simplified using mathematical properties and operations.

Knowledge:

Students will know...

Definitions for: radical expression, simplest form of a radical, rationalizing the denominator, conjugates, like radicals, quadratic equation

Skills:

Students will be able to...

- Simplify square and cube roots.
- Simplify square roots with limited variables.
- Perform operations with radicals.
- Rationalize denominators.
- Write equivalent radical expressions.
- Solve quadratics using square roots.
- Approximate irrational solutions.
- Evaluate square roots of perfect squares.
- Evaluate expressions involving square roots.

Standards:

Algebra 1 Standard	Algebra 1 Standard Description	PA Keystone Algebra I Standards
CC.2.2.8.B.1	Apply concepts of radicals and integer exponents to generate equivalent expressions.	A1.1.1.1
CC.2.2.HS.D.2	Write expressions in equivalent forms to solve problems	A1.1.1.2
CC.2.2.HS.D.8	Apply inverse operations to solve equations or formulas	A1.1.2.1

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: A Stellar View, pg. 522 – 523
- STEM Performance Task: Golden Rectangle (Supplemental)
- Big Idea Tasks: Performing Operations with Square Roots (Supplemental)
- Big Idea Tasks: Writing and Solving Quadratic Equations (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 9 Common Assessment: Sections 9.1, 9.3

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
9.1	Properties of Radicals	- Simplify expressions using radical properties - Rationalize denominators - Perform operations with radicals	- CPA approach with radical tiles - Real-world problems with measurements - Interactive whiteboard practice - Math stations: simplify, rationalize, operate - Use of radical expression foldables
9.3	Solving Quadratic Equations Using Square Roots	- Solve quadratics using square roots - Estimate irrational solutions	- CPA with solving equations - Anchor chart of square root properties - Number line estimation - Solve-and-swap peer activity - Spiral review station

Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.
- Provide more rigorous opportunities for mathematical proof.

- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects

Chapter 11: Data Analysis and Displays

Desired Results

Essential Questions:

- How can data be represented in various forms to accurately communicate information?
- What do measures of center and variation tell us about a data set?
- How can box-and-whisker plots and data distributions help compare and analyze sets of data?
- How do we determine the most appropriate way to display data?

Enduring Understandings:

Students will understand that...

- Data analysis involves understanding, organizing, representing, and interpreting data using various tools.
- Measures of center and variation provide insight into the distribution and spread of data.
- Different graphical displays highlight different features of data, and selecting the right display is critical to accurate data interpretation.
- Analyze relationships and patterns between two categorical variables.
- Awareness of misleading data displays is key in critical analysis of presented information.

Knowledge:

Students will know...

Definitions for: measure of center, mean, median, mode, outlier, measure of variation, range, box-and-whisker plot, quartile, five-number summary, interquartile range, segmented bar graph, qualitative (categorical) data, misleading graph, probability, compound probability

Skills:

Students will be able to...

- Calculate and interpret measures of center and variation (mean, median, mode, range, IQR).
- Create and analyze data displays, such as box-and-whisker plots, segmented bar graphs, and others.

- Determine probability of compound events.
- Choose the most appropriate data display for a given data set and recognize misleading representations.

Standards:

Algebra 1 Standard Code	Algebra 1 Standard Description	PA Keystone Algebra I Standards
CC.2.4.HS.B.1	Summarize, represent, and interpret data on a single count or measurement variable.	A1.2.3.1 A1.2.3.2
CC.2.4.HS.B.2	Summarize, represent, and interpret data on two categorical and quantitative variables.	A1.2.3.1 A1.2.3.2

Acceptable Evidence

Problem Solving Tasks:

- Performance Task: Robotics, pg. 610 – 611
- STEM Performance Task: Shoe Ownership (Supplemental)
- Big Idea Tasks: Understanding Measures of Center and Variation (Supplemental)
- Big Idea Tasks: Writing and Comparing Data Sets (Supplemental)
- Big Idea Tasks: Understanding a Two – Way Table (Supplemental)
- Big Idea Tasks: Analyzing Data for a Company (Supplemental)

Acceptable evidence of learning other than Performance Tasks:

Formative Assessment

- Warm-ups & Exit Slips
- Checkpoint assignments for each cycle
- Resources from the textbook, including remedial practice and enrichment opportunities
- Classwork
- Keep a notebook with pen and paper or use Microsoft OneNote
- Homework
- Quizzes
- Online Applications

Summative Assessment

- Chapter 11 Common Assessment: Sections 11.1 – 11.2, 11.4 – 11.6, Supp. Stem and Leaf, Probability and Odds
 - Chapter 11 Quiz: Sections 11.1 – 11.2, Supp. Stem and Leaf

Suggested Learning Experiences and Instructional Strategies

Instructional Strategies:

Lesson	Title	Key Objectives	Instructional Strategies
11.1	Measures of Center and Variation	• Find mean, median, and mode. • Calculate range and interquartile range. • Compare and interpret data sets.	• Use of real-world data sets (e.g., sports stats). • CPA model with manipulatives and visuals. • Interactive graphing tools (technology integration). • Pair-share data interpretation tasks. • Math journals for reflection.
11.2	Box-and-Whisker Plots	• Create box-and-whisker plots. • Interpret components of plots. • Identify and analyze outliers. • Compare data sets using plots.	• Technology: graphing calculators or Desmos. • Real-world application: test score analysis. • Cooperative learning in small groups. • Anchor charts for visual reference.

11.6	Choosing a Data Display	• Classify qualitative vs. quantitative data. • Select appropriate data displays. • Recognize and critique misleading graphs.	• Project-based learning (create a misleading vs accurate graph). • Kahoot quizzes to reinforce concepts. • Use of flowcharts for display selection. • Student presentations of created displays.
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Differentiation Options

- Utilize study guide and intervention for students who need more reteaching.
- Tier 1:
 - In – Class Practice Quick Check Exercises
 - Lesson Extra Practice
 - Lesson Dig Deeper
 - Differentiating the lesson to reinforce or extend student learning
- Tier 2:
 - Skill Builder for prior learning skills
- Tier 3:
 - Skills Foundation to support skill development
- Skills Trainer for additional skills-based practice
- Performance, STEM, and Big Idea Tasks for lesson extension and enrichment

For Language Development

- Create a student-made dictionary that includes terms, definitions, and examples organized by chapter.
- Make flash cards for terms and examples, then mix and match.
- Use the study guide document with clear definitions and vocabulary development opportunities.
- Discuss the Chapter Closure, encouraging students to use the chapter vocabulary.
- Multi-Language Glossaries/Online Translate feature

For Advanced Learners

- Meet in small groups with students who need enrichment to provide instruction and learning activities on the optional skills followed up by an alternative and more complex assignment.
- Excuse the students from standard practice and use appropriately challenging practice that requires students to apply the concepts in more rigorous ways to challenge their thinking and allow students to go deeper on the same skills.

- Provide more rigorous opportunities for mathematical proof.
- There are many resources available throughout our textbook and digital resources to draw upon for enrichment.
 - Practice sets from the textbook based on the readiness level to address individual needs.
 - Application practice
 - Enrichment projects