

TRUMBULL PUBLIC SCHOOLS
Trumbull, Connecticut

ACP ALGEBRA I-B
Grade 9
Mathematics Department
2021

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Algebra 1-B

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The Trumbull Board of Education will continue to take Affirmative Action to ensure that no persons are discriminated against in its employment.

CORE VALUES AND BELIEFS

The Trumbull School Community engages in an environment conducive to learning which believes that all students will **read** and **write effectively**, therefore communicating in an articulate and coherent manner. All students will participate in activities **that present problem-solving through critical thinking**. Students will use technology as a tool applying it to decision making. We believe that by fostering self-confidence, self-directed and student-centered activities, we will promote **independent thinkers and learners**. We believe **ethical conduct** to be paramount in sustaining the welcoming school climate that we presently enjoy.

Approved 8/26/2011

INTRODUCTION & PHILOSOPHY

Algebra 1-B is a prerequisite for all high school and college mathematics and thus provides a necessary foundation for higher-level mathematics. Students develop abstract reasoning and critical thinking skills, develop a better understanding of the world in which they live, and become better able to correctly apply mathematical knowledge when required. The focus areas of Algebra 1-B help students gain strong foundations, including a solid understanding of concepts, a high degree of procedural skill and fluency, and the ability to apply the math they know to solve problems inside and outside the classroom.

The *Algebra I* textbook by Pearson (2015) offers a blended print and digital curriculum that is built on a foundation of problem solving and visual learning. This curriculum guide has been updated to reflect the new resources provided by the textbook, including technology. Additionally, some topics within the course have been reordered. Based upon student and teacher feedback from upper-level courses, student performance, and the requirements of the redesigned SAT, topics have been added to increase the rigor of Algebra 1 .

Students should have completed Algebra 1-B Year One prior to Algebra 1-B . After successful completion of Algebra 1-B , students will be prepared to take Geometry and Algebra II.

Algebra 1-B is only offered at Trumbull High School for students whose performance suggests that they are cognitively ready to attain the standards.

COURSE GOALS

Algebra 1-B takes a balanced instructional approach to promote the understanding of important mathematical concepts, skills, procedures, and ways of thinking and reasoning.

The following course goals derive from the 2010 Connecticut Core Standards for Mathematical Content.

N-RN The Real Number System

Extend the properties of exponents to radical exponents. Use properties of rational and irrational numbers.

N-Q Quantities

Reason quantitatively and use units to solve problems.

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions. Write expressions in equivalent forms to solve problems.

A-APR Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials. Understand the relationship between zeros and factors of polynomials.

A-CED Creating Equations

Create equations that describe numbers or relationships.

A-REI Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning. Solve equations and inequalities in one variable. Solve systems of equations. Represent and solve equations and inequalities graphically.

F-IF Interpreting Functions

Understand the concept of a function and use function notation. Interpret functions that arise in applications in terms of the context. Analyze functions using different representations.

F-BF Building Functions

Build a function that models a relationship between two quantities. Build new functions from existing functions.

F-LE Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems. Interpret expressions for functions in terms of the situation they model.

S-ID Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurement variable. Summarize, represent, and interpret data on two categorical and quantitative variables. Interpret linear models.

S-IC Making Inferences and Justifying Conclusions

Make inferences and justify conclusions from sample surveys, experiments, and observational studies.

S-CP Conditional Probability and the Rules of Probability

Understand independence and conditional probability and use them to interpret data.

The following course goals derive from the 2010 Connecticut Core Standards for Mathematical Practices, which describe varieties of expertise that all teachers of mathematics will develop in their students. These practices rest on important “processes and proficiencies” that have long been valued in mathematics education.

1. Make sense of problems and persevere in solving them.

Mathematically proficient students start by explaining to themselves the meaning of a problem and looking for entry points to its solution. They analyze givens, constraints, relationships, and goals. They make conjectures about the form and meaning of the solution and plan a solution pathway rather than simply jumping into a solution attempt. They consider analogous problems, and try special cases and simpler forms of the original problem in order to gain insight into its solution. They monitor and evaluate their progress and change course if necessary.

2. Reason abstractly and quantitatively.

Mathematically proficient students make sense of quantities and their relationships in problem situations. They bring two complementary abilities to bear on problems involving quantitative relationships: the ability to decontextualize—to abstract a given situation and represent it symbolically and manipulate the representing symbols as if they have a life of their own, without necessarily attending to their referents—and the ability to contextualize, to pause as needed during the manipulation process in order to probe into the referents for the symbols involved. Quantitative reasoning entails habits of creating a coherent representation of the problem at hand; considering the units involved; attending to the meaning of quantities, not just how to compute them; and knowing and flexibly using different properties of operations and objects.

3. Construct viable arguments and critique the reasoning of others.

Mathematically proficient students understand and use stated assumptions, definitions, and previously established results in constructing arguments. They make conjectures and build a logical progression of statements to explore the truth of their conjectures. They are able to analyze situations by breaking them into cases, and can recognize and use counterexamples. They justify their conclusions, communicate them to others, and respond to the arguments of others. They reason inductively about data, making plausible arguments that take into account the context from which the data arose. Mathematically proficient students are also able to

compare the effectiveness of two plausible arguments, distinguish correct logic or reasoning from that which is flawed, and—if there is a flaw in an argument—explain what it is.

4. Model with mathematics.

Mathematically proficient students can apply the mathematics they know to solve problems arising in everyday life, society, and the workplace.

Mathematically proficient students who can apply what they know are comfortable making assumptions and approximations to simplify a complicated situation, realizing that these may need revision later. They are able to identify important quantities in a practical situation and map their relationships using such tools as diagrams, two-way tables, graphs, flowcharts and formulas. They can analyze those relationships mathematically to draw conclusions. They routinely interpret their mathematical results in the context of the situation and reflect on whether the results make sense, possibly improving the model if it has not served its purpose.

5. Use appropriate tools strategically.

Mathematically proficient students consider the available tools when solving a mathematical problem. These tools might include pencil and paper, concrete models, a ruler, a protractor, a calculator, a spreadsheet, a computer algebra system, a statistical package, or dynamic geometry software. Proficient students are sufficiently familiar with tools appropriate for their grade or course to make sound decisions about when each of these tools might be helpful, recognizing both the insight to be gained and the tools' limitations. For example, mathematically proficient high school students analyze graphs of functions and solutions generated using a graphing calculator. They detect possible errors by strategically using estimation and other mathematical knowledge. When making mathematical models, they know that technology can enable them to visualize the results of varying assumptions, explore consequences, and compare predictions with data. They are able to use technological tools to explore and deepen their understanding of concepts.

6. Attend to precision.

Mathematically proficient students try to communicate precisely to others. They try to use clear definitions in discussion with others and in their own reasoning. They state the meaning of the symbols they choose, including using the equal sign consistently and appropriately. They are careful about specifying units of measure, and labeling axes to clarify the correspondence with quantities in a problem. They calculate accurately and efficiently, expressing numerical answers with a degree of precision appropriate for the problem context. By the time they reach high school they have learned to examine claims and make explicit use of definitions.

7. Look for and make use of structure.

Mathematically proficient students look closely to discern a pattern or structure. They also can step back for an overview and shift perspective. They can see complicated things, such as some algebraic expressions, as single objects or as being composed of several objects.

8. Look for and express regularity in repeated reasoning.

Mathematically proficient students notice if calculations are repeated, and look both for general methods and for shortcuts. As they work to solve a problem, mathematically proficient students maintain oversight of the process, while attending to the details. They continually evaluate the reasonableness of their intermediate results.

The following course goals derive from the 2014 International Society for Technology in Education Standards.

1. Creativity and Innovation – Students demonstrate creative thinking, construct knowledge, and develop innovative products and processes using technology.
2. Communication and Collaboration – Students use digital media and environments to communicate and work collaboratively, including at a distance, to support individual learning and contribute to the learning of others.
3. Research and Information Fluency – Students apply digital tools to gather, evaluate, and use information.
4. Critical Thinking, Problem Solving, and Decision Making – Students use critical thinking skills to plan and conduct research, manage projects, solve problems, and make informed decisions using appropriate digital tools and resources.
5. Digital Citizenship – Students understand human, cultural, and societal issues related to technology and practice legal and ethical behavior.

COURSE ENDURING UNDERSTANDINGS

Students will understand that . . .

- linear, exponential, and quadratic equations can be used to model real-life situations, develop inferences, and make informed decisions.
- technology can help them analyze, organize, and display data to support their conclusions.

COURSE ESSENTIAL QUESTIONS

- How can we take real-life data and model it mathematically?
- How can linear, exponential, and quadratic equations help us make informed decisions about the world around us?
- How can we use graphing calculators to translate real-life data into mathematical models?

COURSE KNOWLEDGE & SKILLS

Students will understand . . .

- the key vocabulary of algebraic mathematics;
- algebraic expression, coefficient, constant, distributive property, linear inequalities, real numbers, variable;
- dependent variable, domain, function, function notation, independent variable, linear function, mapping diagram, non-linear function, parabola, range, relation, vertical line test;
- causation, correlation, correlation coefficient, extrapolation, initial value, interpolation, line of best fit, linear model, parameter, point-slope form, rate of change, scale, scatterplot, slope, slope-intercept form, standard form, regression expression, regression line, trend line, unit rate, velocity, x -intercept, y -intercept;
- break-even point, elimination method for solving systems of equations, fixed cost, graphing method for solving systems of equations, profit, revenue, solution of a system of linear equations, substitution method for solving systems, system of linear equations, system of linear inequalities;
- compound interest, decay factor, doubling time, exponential decay, exponential function, exponential growth, growth factor, half-life, laws of exponents, radical expressions, rate of change;
- ascending order, axis of symmetry, binomial, degree, descending order, difference of two squares, discriminant, expanded form, factored form, factoring by grouping, leading coefficient, maximum, minimum, monomial, perfect square trinomial, quadratic, quadratic formula, quadratic function, quadratic equation, root, standard form of a quadratic equation, trinomial, vertex, zero product property; and
- box-and-whisker plot, interquartile range (IQR), mean, measures of central tendency, median, mode, outlier, quartile, range.

Students will be able to . . .

- solve multi-step equations and linear inequalities with and without the use of a calculator.
- use graphing and statistical functions of a graphing calculator.
- represent functions using tables, equations, and graphs.
- use function notation.
- write linear equations.
- find the line of best fit, analyze trend lines, and make scatterplots.
- solve systems of inequalities by graphing.
- learn the rules of exponents and use them to simplify expressions.
- identify the parameters of exponential functions and how they affect the graph of a function.
- apply exponential functions to real-world situations.
- add, subtract, and simplify radicals.
- rationalize the denominator of radicals.
- add, subtract, and multiply polynomials.
- factor polynomials.
- solve quadratic equations.
- graph a parabola using the intercepts and vertex.

- describe a data set using measures of central tendency.
- organize data in displays such as frequency tables, histograms, and box-and-whisker plots.
- identify outliers and explain how they affect the spread of data

COURSE SYLLABUS

Course Name

Algebra 1-B

Level

Advanced College-Preparatory

Prerequisites

Completion of Algebra 1-B Year One

Materials Required

TI-84 graphing calculator

General Description of the Course

Algebra 1-B is designed to develop the eight standards of mathematical practice in students. The course is broken into fourteen units of study. Students will solve linear equations and inequalities. They will explore functions and derive linear models in order to analyze situations, make predictions, and solve problems. Students will study scatterplots and trend lines as well as measures of central tendency. They will solve systems of equations graphically, numerically, and algebraically and make choices between competing situations in real-world contexts. Exponents and exponential equations are investigated. Students will study quadratic equations and functions. They will apply them to real life applications. The course concludes with the study of one-variable statistics.

Assured Assessments

Students will be evaluated by their performance on formative assessments (reflection/journal entries, exit slips, formative performance tasks) as well as summative assessments (common end-of-unit assessments), and departmental midterm and final examinations.

Core Text

Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.

UNIT 1 **Solving Linear Equations**

Time Allotment: Approximately 2 Weeks

Unit Goals: At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*

A-CED Creating Equations

Create equations that describe numbers or relationships.

1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

A-REI Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning.

1. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Solve equations and inequalities in one variable.

3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

N-RN The Real Number System

Use properties of rational and irrational numbers.

3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

N-Q Quantities

Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Unit Essential Questions

- How can I use linear equations to solve real-world problems?
- What is a solution set for a linear equation?

- Students will write, simplify, evaluate, and model situations involving linear equations.
- Students will then examine the concept of equality and use linear equations to model and solve real-world problems.

Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 2-1, 2-2, 2-3, 2-4, 2-5

UNIT 2

Solving Linear Inequalities & Ratios, Proportions & Percents

Time Allotment: Approximately 2 Weeks

Unit Goals: At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

2. Interpret expressions that represent a quantity in terms of its context.
 - c. Interpret parts of an expression, such as terms, factors, and coefficients.
 - d. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*

A-CED Creating Equations

Create equations that describe numbers or relationships.

2. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
5. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

A-REI Reasoning with Equations and Inequalities

Understand solving equations as a process of reasoning and explain the reasoning.

2. Explain each step in solving a simple equation as following from the equality of numbers asserted at the previous step, starting from the assumption that the original equation has a solution. Construct a viable argument to justify a solution method.

Solve equations and inequalities in one variable.

4. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

N-RN The Real Number System

Use properties of rational and irrational numbers.

4. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

N-Q Quantities

Reason quantitatively and use units to solve problems.

4. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
5. Define appropriate quantities for the purpose of descriptive modeling.

6. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Unit Essential Questions

- How can I use linear inequalities to solve real-world problems?
- What is a solution set for linear inequality?
- What kinds of relationships can proportions represent?

Scope and Sequence

- Students will write, simplify, evaluate, and model situations involving linear inequalities.
- Students will then examine the concept of linear inequalities to model and solve real-world problems.
- Students will determine unknowns in problems involving ratios and percents.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 2-7, 2-9, 3-1, 3-2, 3-3, & 3-4

UNIT 3

Functions

Time Allotment: Approximately 2.5 weeks

Unit Goals

At the completion of this unit, students will:

N-Q Quantities

Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
2. Define appropriate quantities for the purpose of descriptive modeling.

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*

A-CED Creating Equations

Create equations that describe numbers or relationships.

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

A-REI Reasoning with Equations and Inequalities

Represent and solve equations and inequalities graphically.

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

Unit Essential Questions

- What is a function?
- What are the different ways in which functions may be represented?
- How can functions be used to model real-world situations, make predictions, and solve problems?

Scope and Sequence

- Students will be introduced to the concept of a function.
- After identifying relationships that are not functions, students will learn how to define the domain and range of a discrete function.
- Students will organize and analyze data in tables and graphs and use the information to describe relationships.
- Students will be introduced to function notation and will evaluate functions.

- Students will be exposed to a variety of functions, with emphasis on distinguishing between linear functions and nonlinear functions.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 4-1, 4-2, 4-3, 4-4, 4-5, & 4-6 (set builder notation)

UNIT 4 Linear Functions

Time Allotment: Approximately 3-4 weeks

Unit Goals

At the completion of this unit, students will:

N-Q Quantities

Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
2. Define appropriate quantities for the purpose of descriptive modeling.

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.

- a. Interpret parts of an expression, such as terms, factors, and coefficients.
2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

A-CED Creating Equations

Create equations that describe numbers or relationships.

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

F-IF Interpreting Functions

Interpret functions that arise in applications in terms of the context.

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
6. Calculate and interpret the average rate of change of a function (presented symbolically or as a table) over a specified interval. Estimate the rate of change from a graph.

Analyze functions using different representations.

7. Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.
 - a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
 - b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

F-LE Linear, Quadratic, and Exponential Models

Interpret expressions for functions in terms of the situation they model.

5. Interpret the parameters in a linear or exponential function in terms of a context.

Unit Essential Questions

- What are the different ways in which linear functions may be represented?
- What is the significance of a linear function's slope and y -intercept?
- How can linear functions model real-world situations?
- How can linear functions help analyze real-world situations and solve practical problems?

Scope and Sequence

- Students will derive linear models of real-world situations in order to analyze situations, make predictions, and/or solve problems.

- Analyzing situations will often take the form of identifying the real-world meaning of the slope and the x - and y -intercepts of a linear model.
- Making predictions will involve evaluating models for a given independent variable (given x , find y) and solving equations for the independent variable given the dependent variable (given y , find x).
- Problem-solving will occur through the use of various representations: algebraic, tabular, graphic, and numeric.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 5-1, 5-3, 5-4, 5-5, 5-6

UNIT 5

Systems of Linear Equations

Time Allotment: Approximately 2 weeks

Unit Goals

At the completion of this unit, students will:

N-Q Quantities

Reason quantitatively and use units to solve problems.

2. Define appropriate quantities for the purpose of descriptive modeling.
3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A-CED Creating Equations

Create equations that describe numbers or relationships.

3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*

A-REI Reasoning with Equations and Inequalities

Solve systems of equations.

5. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Represent and solve equations and inequalities graphically.

11. Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make table of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
12. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Unit Essential Questions

- What does the number of solutions (none, one, or infinite) of a system of linear equations represent?
- What are the advantages and disadvantages to solving a system of linear equations graphically versus algebraically?

Scope and Sequence

- Students will represent, compare, and analyze two linear equations, look for common solutions, and use this information to make choices between competing situations in real-world contexts.
- Students will solve systems of equations graphically, and algebraically.
- Students will explain what the solution of a system of linear equations represents in the contexts of various applications.

- Students will explore the special cases of parallel lines (no solution) and identical lines (infinite solutions).

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 6-1, 6-2, 6-3, 6-4

UNIT 6 System of Linear Equalities

Time Allotment: Approximately 1 week

Unit Goals

At the completion of this unit, students will:

N-Q Quantities

Reason quantitatively and use units to solve problems.

4. Define appropriate quantities for the purpose of descriptive modeling.
5. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

A-CED Creating Equations

Create equations that describe numbers or relationships.

4. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For*

example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A-REI Reasoning with Equations and Inequalities

Solve systems of equations.

7. Prove that, given a system of two equations in two variables, replacing one equation by the sum of that equation and a multiple of the other produces a system with the same solutions.
8. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Represent and solve equations and inequalities graphically.

13. Explain why the x -coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make table of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.
14. Graph the solutions to a linear inequality in two variables as a half-plane (excluding the boundary in the case of a strict inequality), and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half-planes.

Unit Essential Questions

- What does a solution to a linear inequality look like?
- What does the number of solutions of a system of linear inequalities represent?

Scope and Sequence

- Students will graph linear inequalities.
- Students will represent, compare, and analyze two linear inequalities, and look for common solutions.
- Students will explore the special cases of linear inequalities.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - Sections 6-5, 6-6

Unit 7

Exponent Properties

Time Allotment: Approximately 1-2 weeks

Unit Goals

At the completion of this unit, students will:

8.EE.1 Know and apply the properties of integer exponents to generate equivalent numerical expressions.

N-RN The Real Number System

Extend the properties of exponents to rational exponents.

1. Explain how the definition of the meaning of radical exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*
2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Unit Essential Questions

- How can you simplify expressions using exponents?

Scope and Sequence

- Students will investigate properties of exponents including multiplying and dividing monomials.
- Students will explore the meaning of negative and zero exponents.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 7-1, 7-2, 7-3, 7-4

Unit 8

Exponential Functions

Time Allotment: Approximately 1-2 week

Unit Goals

At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*

Write expressions in equivalent forms to solve problems.

3. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
 - c. Use the properties of exponents to transform expressions for exponential functions. *For example, the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

A-CED Creating Equations

Create equations that describe numbers or relationships.

2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For*

example, represent inequalities describing nutritional and cost constraints on combinations of different foods.

A-REI Reasoning with Equations and Inequalities

Represent and solve equations and inequalities graphically.

10. Understand that the graph of an equation in two variables is the set of all its solutions plotted in the coordinate plane, often forming a curve (which could be a line).

F-BF Building Functions

Build new functions from existing functions.

3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $kf(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graph. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F-LE Linear, Quadratic, and Exponential Models

Interpret expressions for functions in terms of the situation they model.

7. Interpret the parameters in a linear or exponential function in terms of a context.

Unit Essential Questions

- What characterizes exponential growth and decay?
- What are real-world models of exponential growth and decay?
- What are the limitations of exponential growth models?
- How can I differentiate an exponential model from a linear model given a real-world data set?

Scope and Sequence

- Students will derive exponential models of real-world situations in order to analyze situations, make predictions, and/or solve problems.
- Analyzing situations will often take the form of identifying the real-world meaning of the initial value and the growth/decay factor.
- Making predictions will involve evaluating models for a given independent variable (given x , find y).

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 7-6, 7-7

UNIT 9 Polynomials

Time Allotment: Approximately 2 weeks

Unit Goals

At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

1. Interpret expressions that represent a quantity in terms of its context.
 - a. Interpret parts of an expression, such as terms, factors, and coefficients.
 - b. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*
2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

A-APR Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

1. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Unit Essential Questions

- Can two algebraic expressions that appear to be different be equivalent?

Scope and Sequence

- Students will identify polynomials by number of terms and degree.
- Students will learn to add, subtract, and multiply polynomials.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 8-1, 8-2, 8-3, 8-4

UNIT 10 Factoring

Time Allotment: Approximately 3 weeks

Unit Goals

At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

3. Interpret expressions that represent a quantity in terms of its context.
 - c. Interpret parts of an expression, such as terms, factors, and coefficients.
 - d. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*
4. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Write expressions in equivalent forms to solve problems.

5. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

A-APR Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

2. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Unit Essential Questions

- How is the factoring of polynomials related to the multiplication of polynomials?

Scope and Sequence

- Students will identify and factor the GCF from polynomials.
- Students will factor special cases including binomials (difference of squares)
- Students will factor trinomials.
- Students will factor by grouping.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 8-2, 8-5, 8-6, 8-7, 8-8

**Unit 11
Radicals**

Time Allotment: Approximately 2.5 weeks

Unit Goals

At the completion of this unit, students will:

N-RN The Real Number System

Extend the properties of exponents to rational exponents.

3. Explain how the definition of the meaning of radical exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*
4. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Unit Essential Questions

- How can I simplify a radical expression?

Scope and Sequence

- Students will simplify radical expressions involving square roots.
- Students will simplify radical expressions, including those with variables.
- Students will add, subtract and multiply radical expressions.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 10-2, 10-3

UNIT 12

Solving Quadratics

Time Allotment: Approximately 3 weeks

Unit Goals

At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

6. Interpret expressions that represent a quantity in terms of its context.
 - e. Interpret parts of an expression, such as terms, factors, and coefficients.
 - f. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*
7. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Write expressions in equivalent forms to solve problems.

8. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
 - a. Factor a quadratic expression to reveal the zeros of the function it defines.
 - b. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A-APR Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

3. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Understand the relationship between zeros and factors of polynomials.

3. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

Unit Essential Questions

- How do I choose the best method for solving a quadratic equation?

Scope and Sequence

- Students will explore the zero product property.

- Students will solve quadratics by factoring, the quadratic formula, and the square root property.
- Students will understand how to leave solutions in exact and approximated forms.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 9-3, 9-4, & 9-6

UNIT 13

Graphing Quadratic Functions

Time Allotment: Approximately 2 weeks

Unit Goals

At the completion of this unit, students will:

A-SSE Seeing Structure in Expressions

Interpret the structure of expressions.

9. Interpret expressions that represent a quantity in terms of its context.
 - g. Interpret parts of an expression, such as terms, factors, and coefficients.
 - h. Interpret complicated expressions by viewing one or more of their parts as a single entity. *For example, interpret $P(1 + r)^n$ as the product of P and a factor not depending on P .*
10. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Write expressions in equivalent forms to solve problems.

11. Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.
 - c. Factor a quadratic expression to reveal the zeros of the function it defines.
 - d. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.

A-APR Arithmetic with Polynomials and Rational Expressions

Perform arithmetic operations on polynomials.

4. Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials.

Understand the relationship between zeros and factors of polynomials.

4. Identify zeros of polynomials when suitable factorizations are available, and use the zeros to construct a rough graph of the function defined by the polynomial.

A-CED Creating Equations

Create equations that describe numbers or relationships.

1. Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions.
2. Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.

3. Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. *For example, represent inequalities describing nutritional and cost constraints on combinations of different foods.*
4. Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R .*

F-IF Interpreting Functions

Interpret functions that arise in applications in terms of the context.

4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include: intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity.*
5. Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

F-LE Linear, Quadratic, and Exponential Models

Construct and compare linear, quadratic, and exponential models and solve problems.

1. Distinguish between situations that can be modeled with linear functions and with exponential functions.
 - a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
 - b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
 - c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.
2. Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs (include reading these from a table).
3. Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically, or (more generally) as a polynomial function.
4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a , c , and d are numbers and the base b is 2, 10, or e ; evaluate the logarithm using technology.

Unit Essential Questions

- What can the intercepts, vertex (maximum or minimum) and other features of a quadratic function tell me about real-world relationships?

- How can technology support investigation of and experimentation with the ways that parameters affect functions?

Scope and Sequence

- Students will graph quadratics
- Students will find x-intercepts of quadratics algebraically and graphically.
- Students will find the vertex and axis of symmetry algebraically and graphically.
- Students will utilize their graphing calculators to graph quadratic equations.
- Students will explore the many applications of quadratics in everyday life.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 9-1, 9-2, 9-3

UNIT 14

Statistics

Time Allotment: Approximately 2 weeks (time permitting)

Unit Goals

At the completion of this unit, students will:

N-Q Quantities

Reason quantitatively and use units to solve problems.

1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
2. Define appropriate quantities for the purpose of descriptive modeling.

S-ID Interpreting Categorical and Quantitative Data

Summarize, represent, and interpret data on a single count or measurement variable.

1. Represent data with plots on the real number line (dot plots, histograms, and box plots).
2. Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.
3. Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).
4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Interpret linear models.

7. Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
8. Compute (using technology) and interpret the correlation coefficient of a linear fit.
9. Distinguish between correlation and causation.

Summarize, represent, and interpret data on two categorical and quantitative variables.

5. Summarize categorical data for two categories in two-way frequency tables. Interpret relative frequencies in the context of the data (including joint, marginal, and conditional relative frequencies). Recognize possible associations and trends in the data.

Unit Essential Questions

- How can I make predictions and informed decisions based on current numerical information?
- What are the advantages and disadvantages to analyzing data by hand versus by using technology?

- What is the potential impact of making a decision from data that contains one or more outliers?

Scope and Sequence

- Students will explore measures of central tendency and spread and displays of one-variable data, including box-and-whisker plots.
- Students will use the five-number summary to create box-and-whisker plots and identify outliers.
- Students will be introduced to using the STAT menu on the graphing calculator.

Assured Assessments

Formative Assessment:

Each student will participate in at least one reflection/journal entry, exit slip, or formative performance task common to all Algebra 1-B teachers.

Summative Assessment:

Each student will take an end-of-unit assessment common to all teachers at the grade level.

Resources

Core

- Charles, Randall I., et al. *Algebra 1*. New York: Pearson, 2015. Print.
 - o Sections 12-2, 12-3,12-4, 5-7

COURSE CREDIT

One credit in Mathematics

One class period daily for a full year

PREREQUISITES

Completion of Algebra 1-B Year One.

TEXT

Charles, Randall I., et al. *Algebra I*. New York: Pearson, 2015. Print.

SUPPLEMENTARY MATERIALS/RESOURCES/TECHNOLOGY

Department and teacher prepared materials
TI-84 Plus graphing calculators

CURRENT REFERENCES

2010 Connecticut Core Standards for Mathematics

http://www.corestandards.org/assets/CCSSI_Math%20Standards.pdf

TEACHER GUIDE

Unit 1 – Solving Linear Equations

Approximately 2 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
2-1 Solving One-Step Equations	0.5 day
2-2 Solving Two-Step Equations	0.5 day
2-3 Solving Multi-Step Equations	2 days
2-4 Solving Equations with Variables on Both Sides	2 days
2-5 Literal Equations	2 days

Unit 2 – Rates, Ratios, Proportions, Percents, Inequalities

Approximately 2 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
2-7 Solving Proportions	2 days
2-9 Percents	2 days
3-1 Inequalities & Their Graphs	1 day
3-2 Solving Inequalities Using Addition or Subtraction	0.5 day
3-3 Solving Inequalities Using Multiplication or Division	0.5 day
3-4 Solving Multi-Step Inequalities	1 day

Unit 3 – Functions

Approximately 2.5 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
4-1 Using Graphs to Relate Two Quantities	1 day
4-2 Patterns and Linear Functions	1 day
4-3 Patterns and Nonlinear Functions	1 day
4-4 Graphing a Function Rule	1 day
4-5 Writing a Function Rule	1 day
4-6 Formalizing Relations & Functions	3 days

Unit 4 – Linear Functions

Approximately 3-4 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
5-1 Rate of Change & Slope	1 day
5-3 Slope-Intercept Form	2 days
5-4 Point-Slope Form	2 days
5-5 Standard Form	3 days
5-6 Parallel and Perpendicular Lines	2 days

Unit 5 – Systems

Approximately 2 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
6-1 Solving Systems by Graphing	1 day
6-2 Solving Systems using Substitution	2 days
6-3 Solving Systems using Elimination	2 days
6-4 Applications of Linear Systems	2 days

Unit 6 – Two Variable Inequalities

Approximately 1 week (including end-of-unit review & assessment)

Text Section/Topic	Estimated Time
6-5 Linear Inequalities	2 days
6-6 Systems of Linear Inequalities	2 days

Unit 7 – Exponent Properties

Approximately 1-2 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
7-1 Zero and Negative Exponents	1 day
7-2 Multiplying Powers with the Same Base	1 day
7-3 More Multiplication Properties of Exponents	1 day
7-4 Division Properties of Exponents	1 day

***Midterm review & exam (3-4 days)**

Unit 8 – Exponential Functions

Approximately 1-2 week (end-of-unit review & assessment)

Text Section/Topic	Estimated Time
7-6 Exponential Functions	2 days
7-7 Exponential Growth & Decay	2 days

Unit 9 – Polynomials

Approximately 2 weeks (end-of-unit review & assessment)

Text Section/Topic	Estimated Time
8-1 Adding and Subtracting Polynomials	2 days
8-2 Multiplying & Factoring	1 day
8-3 Multiplying Binomials	1 day
8-4 Multiplying Special Cases	1 day

Unit 10 – Factoring

Approximately 3 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
8-2 Multiplying & Factoring	1 day
8-5 Factoring $x^2 + bx + c$	3 days
8-6 Factoring $ax^2 + bx + c$	3 days
8-7 Factoring Special Cases	2 days
8-8 Factoring by Grouping	2 days

Unit 11 – Radicals

Approximately 2.5 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
10-2 Simplifying Radicals	4 days
10-3 Operations with Radical Expressions	4 days

Unit 12 – Solving Quadratics

Approximately 3 weeks (including mid-unit assessment and end-of-unit review & assessment)

Text Section/Topic	Estimated Time
9-3 Solving Quadratic Equations	1 day
9-4 Factoring to Solve Quadratic Equations	2 days
9-6 The Quadratic Formula and the Discriminant	4 days

Unit 13 – Quadratic Functions

Approximately 2 weeks (including end-of-unit review & assessment)

Text Section/Topic	Estimated Time
9-1 Quadratic Graph and Their Properties	2 days
9-2 Quadratic Functions	2 days
9-3 Solving Quadratic Functions	1 day

Unit 14 – Statistics

Approximately 2 weeks (including end-of-unit review & assessment)

Text Section/Topic	Estimated Time
12-2 Frequency and Histograms	1 day
12-3 Measures of Central Tendency and Dispersion	1 day
12-4 Box-and-Whisker Plots	1 day
5-7 Scatter Plots and Trend Lines	2 days

***Final review & exam (3-4 days)**

ASSURED STUDENT PERFORMANCE RUBRICS

Rubric 2: Write Effectively

Category/ Weight	Exemplary 4 Student work:	Goal 3 Student work:	Working Toward Goal 2 Student work:	Needs Support 1-0 Student work:
Purpose X_____	<ul style="list-style-type: none"> Establishes and maintains a clear purpose Demonstrates an insightful understanding of audience and task 	<ul style="list-style-type: none"> Establishes and maintains a purpose Demonstrates an accurate awareness of audience and task 	<ul style="list-style-type: none"> Establishes a purpose Demonstrates an awareness of audience and task 	<ul style="list-style-type: none"> Does not establish a clear purpose Demonstrates limited/no awareness of audience and task
Organization X_____	<ul style="list-style-type: none"> Reflects sophisticated organization throughout Demonstrates logical progression of ideas Maintains a clear focus Utilizes effective transitions 	<ul style="list-style-type: none"> Reflects organization throughout Demonstrates logical progression of ideas Maintains a focus Utilizes transitions 	<ul style="list-style-type: none"> Reflects some organization throughout Demonstrates logical progression of ideas at times Maintains a vague focus May utilize some ineffective transitions 	<ul style="list-style-type: none"> Reflects little/no organization Lacks logical progression of ideas Maintains little/no focus Utilizes ineffective or no transitions
Content X_____	<ul style="list-style-type: none"> Is accurate, explicit, and vivid Exhibits ideas that are highly developed and enhanced by specific details and examples 	<ul style="list-style-type: none"> Is accurate and relevant Exhibits ideas that are developed and supported by details and examples 	<ul style="list-style-type: none"> May contain some inaccuracies Exhibits ideas that are partially supported by details and examples 	<ul style="list-style-type: none"> Is inaccurate and unclear Exhibits limited/no ideas supported by specific details and examples
Use of Language X_____	<ul style="list-style-type: none"> Demonstrates excellent use of language Demonstrates a highly effective use of standard writing that enhances communication Contains few or no errors. Errors do not detract from meaning 	<ul style="list-style-type: none"> Demonstrates competent use of language Demonstrates effective use of standard writing conventions Contains few errors. Most errors do not detract from meaning 	<ul style="list-style-type: none"> Demonstrates use of language Demonstrates use of standard writing conventions Contains errors that detract from meaning 	<ul style="list-style-type: none"> Demonstrates limited competency in use of language Demonstrates limited use of standard writing conventions Contains errors that make it difficult to determine meaning

Rubric 3: Problem Solving through Critical Thinking

Category/Weight	Exemplary 4	Goal 3	Working Toward Goal 2	Needs Support 1-0
Understanding X_____	Student demonstrates clear understanding of the problem and the complexities of the task	Student demonstrates sufficient understanding of the problem and most of the complexities of the task	Student demonstrates some understanding of the problem but requires assistance to complete the task	Student demonstrates limited or no understanding of the fundamental problem after assistance with the task
Research X_____	Student gathers compelling information from multiple sources including digital, print, and interpersonal	Student gathers sufficient information from multiple sources including digital, print, and interpersonal	Student gathers some information from few sources including digital, print, and interpersonal	Student gathers limited or no information
Reasoning and Strategies X_____	Student demonstrates strong critical thinking skills to develop a comprehensive plan integrating multiple strategies	Student demonstrates sufficient critical thinking skills to develop a cohesive plan integrating strategies	Student demonstrates some critical thinking skills to develop a plan integrating some strategies	Student demonstrates limited or no critical thinking skills and no plan
Final Product and/or Presentation X_____	Solution shows deep understanding of the problem and its components. Solution shows extensive use of 21st Century Technology Skills.	Solution shows sufficient understanding of the problem and its components. Solution shows sufficient use of 21st Century Technology Skills.	Solution shows some understanding of the problem and its components. Solution shows some use of 21st Century Technology Skills.	Solution shows limited or no understanding of the problem and its components. Solution shows limited or no use of 21st Century Technology Skills.

Rubric 5: Independent Learners And Thinkers

Category/Weight	Exemplary 4	Goal 3	Working Toward Goal 2	Needs Support 1-0
Proposal X _____	Student demonstrates a strong sense of initiative by generating compelling questions, creating uniquely original projects/work.	Student demonstrates initiative by generating appropriate questions, creating original projects/work.	Student demonstrates some initiative by generating questions, creating appropriate projects/work.	Student demonstrates limited or no initiative by generating few questions and creating projects/work.
Independent Research & Development X _____	Student is analytical, insightful, and works independently to reach a solution.	Student is analytical, and works productively to reach a solution.	Student reaches a solution with direction.	Student is unable to reach a solution without consistent assistance.
Presentation of Finished Product X _____	Presentation shows compelling evidence of an independent learner and thinker. Solution shows deep understanding of the problem and its components. Solution shows extensive and appropriate application of 21 st Century Skills.	Presentation shows clear evidence of an independent learner and thinker. Solution shows adequate understanding of the problem and its components. Solution shows adequate application of 21 st Century Skills.	Presentation shows some evidence of an independent learner and thinker. Solution shows some understanding of the problem and its components. Solution shows some application of 21 st Century Skills.	Presentation shows limited or no evidence of an independent learner and thinker. Solution shows limited or no understanding of the problem. Solution shows limited or no application of 21 st Century Skills.