Algebra I Honors

Unit Title: Unit 1: Expressions, Equations and Functions (35 days)

Stage 1: Desired Results

Standards & Indicators:

A.CED.A.1 – create equations and inequalities in one variable and use them to solve problems

A.CED.A.2 – create equations in two or more variables to represent relationships between quantities, graph equations on coordinate axes with labels and scales

A.CED.A.4 – rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations

A.REI.A.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.

A.REI.B.3 – solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

A.REI.D.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)

A.REI.D.11 – explain why the x-coordinates of the points where the graphs of two equations y = f(x) and y = g(x) intersect are the solutions of the equations f(x) = g(x). Find the solutions using technology, make tables of values and include cases where the functions are linear, polynomial, rational, absolute value, exponential and logarithmic functions.

A.SSE.A.1 – interpret expressions that represent a quantity in terms of its context such as terms, factors and coefficients

A.SSE.A.2 – use the structure of an expression to identify ways to rewrite it

F.IF.A.1 – understand that a function from one set to another assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) is the output corresponding to the input of x.

F.IF.A.2 – use function notation, evaluate functions for inputs in their domains, interpret statements that use function notation in terms of a context

F.IF.A.3 – recognize that sequences are functions sometimes defined as recursively, whose domain is the subset of the integers

F.IF.B.4 – for a function that models a relationship between two quantities, interpret key features of the graph and tables and sketch graphs given a verbal description of the relationship

F.IF.B.5 – relate the domain of a function to its graph and to the quantitative relationship it describes

F.IF.B.6 – calculate and interpret the average rate of change of a function over a specified interval, estimate rate of change from a graph

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Supporting:

F.BF.A.1 – determine an explicit expression, a recursive process or steps for calculation from a context

F.IF.C.7 – graph functions expressed symbolically and show key features of the graph using technology if necessary

F.IF.C.9 – compare properties of two functions each represented in a different way (algebraically or graphically)

F.LE.A.1 – prove that linear functions grow by equal differences over equal intervals, exponential functions grow by equal factors over equal intervals

F.LE.A.2 – construct linear and exponential functions, including arithmetic and geometric sequences given a graph or table

F.LE.B.5 – interpret the parameters in a linear or exponential function in terms of a context

N.Q.A.1 – use units to understand problems and formulas, choose and interpret the origin and the scale in graphs and data displays

N.Q.A.2 – define appropriate quantities for descriptive modeling

N.Q.A.3 – choose a level of accuracy appropriate to limitations on measurement when reporting quantities

Career Readiness, Life Literacies and Key Skills		
Standard	**Performance Expectations**	**Core Ideas**
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.GCA.1	Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGl.1,	Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.

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	7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).	

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Chapter 1 Expressions, descriptive modeling, and functions are all ways to represent mathematical ideas. An algebraic expression consists of one or more numbers and variables along with one or more arithmetic operations. An equation is an expression with an equals sign. A function is a way to represent the relationship between input and output. Chapter 2 A linear equation is a representation of a relationship among quantities that can be shown using a diagram, a verbal description, or a mathematical equation. Equations involving absolute value are solved by isolating the absolute value on one side of the equation and rewriting the equation as a compound sentence. Some equations contain more than one variable. The processes for solving one-step or multi-step equations are used to solve these equations for one variable in terms of the other variable(s). Chapter 3 Linear functions can be algebraic, tabular, graphical, and verbal. Linear equations can be solved by graphing or by using algebraic methods, depending on the degree of precision needed for the solution. Linear functions can be graphed by finding key attributes such as: intercepts, zeros, and slope.	At the end of the Unit, students should be able to answer the Essential Questions: Chapter 1- How can mathematical ideas be represented? Chapter 2- Why is it helpful to represent the same mathematical idea in different ways? Chapter 3- Why are graphs useful?
Content:	**Skills(Objectives):**
1.4 Distributive Property 1.5 Descriptive Modeling and Accuracy 1.6 Relations 1.7 Functions 2.4 Solving Equations with Variables on Each Side 2.5 Solving Equations Involving Absolute Value 2.6 Ratios and Proportions 2.7 Literal Equations and Dimensional Analysis 3.1 Graphing Linear Functions 3.2 Zeros of Linear Functions 3.3 Rate of Change and Slope 3.4 Slope-Intercept Form 3.5 Transformations of Linear Functions 3.6 Arithmetic Sequences as Linear Functions 3.7 Piecewise and Step Functions 3.8 Absolute Value Functions	use the distributive property by multiplying an expression (placed outside parentheses) by each expression inside the parenthesis display real world problems with measurements in a descriptive model using graphs or tables plot points on a coordinate system (Cartesian Plane) list the domain and range of a set of ordered pairs comprehend the rules of a function in which each input may only have one output perform the vertical line test on a graph to determine if the graph represents a function

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	interpret key concepts by analyzing the “behavior” of a graph interpret algebraic symbols and translate them to the correct verbal expressions interpret verbal expressions and translate them to the correct algebraic expressions utilize the arithmetic operations (performing the same operation on each side of the equation) to solve for an unknown variable interpret the concept of absolute value by setting absolute value equations equal the stated value and its opposite (the negation of that value) divide the numerator by the denominator in a ratio and compare this quotient to other ratios to determine equality cross multiply (sometimes utilizing distributive property) to find an unknown variable in a proportion utilize concepts of solving equations (for a numeric value) when solving for a variable graph an equation by creating a table of inputs and outputs and plotting the points on a Cartesian Plane graph an equation and interpret the points where the line crosses the x and y intercepts find the zeros of a function by subbing zero into the y value and solving for x. Interpret rate of change by analyzing the “rise” and “run” between two points of a line Find the slope of a line by utilizing the formula (between two coordinates): y2 – y1 / x2 – x1 Isolate the y variable in a two variable equation to convert to slope intercept form: y = mx + b where m is the slope and b is the y-intercept Understand concepts of transformations of a line (y = mx + b) in which changes to the m changes the slope of the line and changes to the b results in a shift of the line Analyze the values of a sequence and determine if there is a common difference

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	Identify two types of step functions: piecewise-linear functions (graphing a function for specified intervals of x) and greatest integer functions Utilize concepts of transformations to an absolute value equation and understand what magnifies/diminishes the shape of the graph, what makes it reflect and what makes the graph shift (translate).

Interdisciplinary Connections:

Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

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

Stage 2: Assessment Evidence

Performance Task(s):	Other Evidence:
A.CED.A.4 Equations and Formulas A.REI.A.1 Zero Product Property 1 F.IF.B.5 The Restaurant F.IF.B.6 Mathemafish Population	Written and Online Assignments Exit Cards Cornell Notes CFA's (common formative assessments) Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments

Stage 3: Learning Plan

Learning Opportunities/Strategies:	Resources:
Lesson 3.1 Graphing Linear Functions- Graph linear equation, construct input-output tables determine if an equation is linear Lesson 3.2 Zeros of Linear Functions- find the point of a line that crosses the x-axis (the zero of a function), substitute the y value of a two variable equation with zero Lesson 3.3 Rate of Change and Slope- find the slope of a line, utilize the slope formula y2-y1 / x2-x1, interpret rate of change	Glencoe Algebra 1 Textbook (Chapter 1-3) IXL Edulastic Kahoot Classkick NJSLA Digital Library Khan Academy Lesson Presentations and Videos Graphing Calculator Desmos Google Apps for Education Illuminations.nctm.org Padlet

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Lesson 3.4 Slope-Intercept Form- isolate y in an equation, put equations in y=mx+b form, interpret slope and y-intercept Lesson 3.5 Transformations of Linear Functions- write functions to represent the given transformations (both shifts and changes to slope) Lesson 3.6 Arithmetic Sequences as Linear Functions- identify arithmetic sequences, find the common difference between a set of numbers, find the nth term of a sequence by utilizing the sequences formula Lesson 3.7 Piecewise and Step Functions- find the domain and range of step functions, graph step functions Lesson 3.8 Absolute Value Functions- graph absolute value functions, graph the transformations of absolute value functions	Inclusive Math Class GLSEN Educator Resources

Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring Pair student with a high achieving student	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 2: Writing Equations and Inequalities (35 days)

Stage 1: Desired Results

Standards & Indicators:

Major:

A.CED.A.1 - create equations and inequalities in one variable and use them to solve problems

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

A.CED.A.3 – represent constraints by equations or inequalities and by systems of equations and/or inequalities, interpret solutions as viable or nonviable options in a modeling context

A.REI.B.3 –solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

A.REI.D.12 – graph the solutions to a linear inequality in two variables as a half plane and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half planes

F.IF.A.2 –use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context

S.ID.C.7 –interpret the slope and the intercept of a linear model in the context of the data

S.ID.C.8 –compute using technology and interpret the correlation coefficient of a linear fit

S.ID.C.9 –distinguish between correlation and causation

Supporting:

F.BF.A.1- determine an explicit expression, a recursive process or steps for calculation from a context

F.LE.B.5 –interpret the parameters in a linear or exponential function in terms of a context

N.Q.A.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

S.ID.B.6 –fit a function to the data; use functions fitted to data to solve problems in the context of the data. Use given functions or choose a function suggested by the context. Emphasize linear, quadratic and exponential models.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).	With a growth mindset, failure is an important part of success.

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9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse solutions are needed.
9.4.12.GCA.1	Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).	Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences.

Central Idea/Enduring Understanding:

Chapter 4
Equations of linear functions can be used to interpret and make decisions, predictions, and critical judgments from functional relationships. Equations can be written in slope-intercept form, or point-slope form. Most linear functions have inverses. To find the inverse of a linear function replace $f(x)$ with y, interchange $y$and x, solve the equation for y, and replace y with $f^{-1}(x)$ in the new equation.

Chapter 5
A linear inequality is an open sentence that contains <, >, ≤, or ≥. Inequalities can be solved by using algebraic methods similar to solving equations. Inequalities involving absolute value can be solved by writing them as compound inequalities. Inequalities in two variables are solved by graphing the inequality as if it were an equation, and then shading the half-plane that makes the inequality true.

Essential/Guiding Question:

At the end of the Unit, students should be able to answer the Essential Questions:

Chapter 4- Why is math used to model real world situations?
Chapter 5- How are symbols useful in mathematics?

Content:
4.1 Writing Equations in Slope Intercept Form
4.2 Writing Equations in Standard and Point Slope Form
4.3 Parallel and Perpendicular Lines
4.4 Scatter Plots and Lines of Fit
4.5 Correlation and Causation
4.6 Regression and Median Fit Lines
4.7 Inverse of Linear Functions

Skills(Objectives):

Students will be able to:
write an equation of a line in standard form

write an equation of a line in point-slope form

find the slope of a line given two points

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5.1 Solving Inequalities by Addition/Subtraction 5.2 Solving Inequalities by Multiplication/Division 5.3 Solving Multi Step Inequalities 5.4 Solving Compound Inequalities 5.5 Solving Inequalities Involving Absolute Value 5.6 Graphing Inequalities in Two Variables	write an equation of a line that passes through a given point parallel to a given line write an equation of a line that passes through a given point perpendicular to a given line create a scatter plot given a set of points create a line of best fit use a line of best fit to make and evaluate predictions determine whether a data set or situation illustrates correlation or causation write an equation of best fit line using linear regression write an equation of median-fit line find the inverse of a relation find the inverse of a function solve an inequality by using the different arithmetic operations

Interdisciplinary Connections:

Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

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

Stage 2: Assessment Evidence

Performance Task(s):	Other Evidence:
A.REI.B.3 Reasoning with Linear Inequalities A.REI.D.12 Fishing Adventures 3 S.ID.C.7-9 Coffee and Crime F.LE.B.5 US Population 1982-1988	Written and Online Assignments Exit Cards Cornell Notes CFA's (common formative assessments) Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments

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Stage 3: Learning Plan	
Learning Opportunities/Strategies: Lesson 4.1 Writing Equations in Slope Intercept Form – write an equation given slope and point, write an equation given two points, find the slope of a line given two points Lesson 4.2 Writing Equations in Standard and Point Slope Form – convert equations between forms, manipulate equations using the arithmetic operations Lesson 4.3 Parallel and Perpendicular Lines – identify parallel lines by analyzing slopes, identify perpendicular lines by analyzing slopes Lesson 4.4 Scatter Plots and Lines of Fit – plot points, identify dependent and independent variables, make predictions using line of best fit Lesson 4.5 Correlation and Causation – determine correlation coefficient between two variables, determine if two variables have causation Lesson 4.6 Regression and Median Fit Lines – use a graphing calculator to find the linear regression line, write the line of best fit Lesson 4.7 Inverse of Linear Functions – find the inverse of a relation, switch x and y coordinates, find the inverse of a function, graph the inverse of a function Lesson 5.1 Solving Inequalities by Addition/Subtraction – isolate a variable in an inequality using addition and subtraction, graph the solution set Lesson 5.2 Solving Inequalities by Multiplication/Division – isolate a variable in an inequality using multiplication and division, graph the solution set Lesson 5.3 Solving Multi Step Inequalities – solve inequalities with variables on both sides of the sign, manipulate inequalities using the four arithmetic operations, graph solution set Lesson 5.4 Solving Compound Inequalities – identify a compound inequality, isolate the variable in each inequality and graph solution set on the same number line	**Resources:** Glencoe Algebra 1 Textbook (Chapters 4 and 5) IXL Edulastic Kahoot Classkick NJSLA Digital Library Khan Academy Lesson Presentations and Videos Graphing Calculator Desmos Google Apps for Education Illuminations.nctm.org Padlet Inclusive Math Class GLSEN Educator Resources

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Lesson 5.5 Solving Inequalities Involving Absolute Value – solve and graph absolute value inequalities and graph solution set on a number line Lesson 5.6 Solving Two Variable Inequalities – isolate the dependent variable, graph the solution on a Cartesian Plane	

Differentiation
*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction TutoringPair student with a high achieving student	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 3 Systems and Exponents (35 days)

Standards & Indicators:

Major:

A.CED.A.1 – create equations and inequalities in one variable and use them to solve problems

A.CED.A.2 – create equations in two or more variables to represent relationships between quantities, graph equations on coordinate axes with labels and scales

A.CED.A.3- represent constraints by equations or inequalities and by systems of equations and/or inequalities, interpret solutions as viable or nonviable options in a modeling context

A.CED.A.4 – rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations

A.REI.A.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.

A.REI.B.3 – solve linear equations and inequalities in one variable, including equations with coefficients represented by letters

A.REI.D.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)

A.REI.D.11 – explain why the x-coordinates of the points where the graphs of two equations y = f(x) and y = g(x) intersect are the solutions of the equations f(x) = g(x). Find the solutions using technology, make tables of values and include cases where the functions are linear, polynomial, rational, absolute value, exponential and logarithmic functions.

A.REI.D.12- graph the solutions to a linear inequality in two variables as a half plane and graph the solution set to a system of linear inequalities in two variables as the intersection of the corresponding half planes

A.SSE.A.1 – interpret expressions that represent a quantity in terms of its context such as terms, factors and coefficients

A.SSE.A.2 – use the structure of an expression to identify ways to rewrite it

F.IF.A.1 – understand that a function from one set to another assigns to each element of the domain exactly one element of the range. If f is a function and x is an element of its domain, then f(x) is the output corresponding to the input of x.

F.IF.A.2 – use function notation, evaluate functions for inputs in their domains, interpret statements that use function notation in terms of a context

F.IF.A.3 – recognize that sequences are functions sometimes defined as recursively, whose domain is the subset of the integers

F.IF.B.4 – for a function that models a relationship between two quantities, interpret key features of the graph and tables and sketch graphs given a verbal description of the relationship

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F.IF.B.5 – relate the domain of a function to its graph and to the quantitative relationship it describes

F.IF.B.6 – calculate and interpret the average rate of change of a function over a specified interval, estimate rate of change from a graph

F.IF.8b. Use properties of exponents to interpret expressions for exponential functions

Supporting:

F.BF.A.1 – determine an explicit expression, a recursive process or steps for calculation from a context

F.IF.C.7 – graph functions expressed symbolically and show key features of the graph using technology if necessary
F.IF.C.8- write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function

F.IF.C.9 – compare properties of two functions each represented in a different way (algebraically or graphically)

F.LE.A.1 – prove that linear functions grow by equal differences over equal intervals, exponential functions grow by equal factors over equal intervals

F.LE.A.2 – construct linear and exponential functions, including arithmetic and geometric sequences given a graph or table

F.LE.B.5 – Interpret the parameters in a linear or exponential function in terms of a context

N.Q.A.1 – use units to understand problems and formulas, choose and interpret the origin and the scale in graphs and data displays

Additional:

A.REI.5 Solve system of equations.

N.RN.B.3 explain why the sum or product of two rational numbers is rational, that the sum of a rational and irrational is irrational, and that the product of a nonzero rational and irrational number is irrational.

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly

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		for global issues where diverse solutions are needed.
9.4.12.GCA.1	Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).	Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences different points of view and experiences.

Central Idea/Enduring Understanding:	**Essential/Guiding Question:**
Chapter 6 A system of equations is a set of equations with the same variables. Systems of equations can be solved by graphing the equations on the same coordinate plane or by using algebraic methods, depending on the degree of precision needed for the solution. Systems of inequalities are solved by graphing the inequalities and identifying the set of all points that satisfy both inequalities. Chapter 7 Exponents and exponential functions have laws like all real numbers. Exponential growth and decay can be represented algebraically or by tables and graphs. Geometric sequences relate to exponential functions and recursive formulas.	At the end of the Unit, students should be able to answer the Essential Questions: Chapter 6- How can you find the solution to a math problem? Chapter 7- How can you make good mathematical decisions? What factors can affect good decision making?

Content: Chapters 6 and 7	**Skills(Objectives):**
6.1 graph systems of equations 6.2 substitution 6.3 elimination using addition and subtraction 6.4 elimination using multiplication 6.5 applying systems of linear equations 6.6 systems of inequalities 7.1 multiplication properties of exponents 7.2 division properties of exponents 7.3 rational exponents 7.5 exponential functions 7.6 transformations of exponential functions 7.7 writing exponential functions 7.8 transforming exponential expressions 7.9 geometric sequences as exponential functions	Students will be able to: solve a system of linear equations by graphing solve a system of linear equations by using substitution solve a system of linear equations by using elimination determine the best method of solving systems of equations apply systems of equations to real world situations solve a system of linear inequalities by graphing

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7.10 recursive formulas	apply systems of inequalities to real world situations multiply monomials using the properties of exponents simplify expressions using the multiplication properties of exponents divide monomials using the properties of exponents simplify expressions containing negative and zero exponents evaluate and rewrite expressions involving rational exponents solve equations involving expressions with rational exponents graph exponential functions identify the effects on the graphs of exponential functions by performing different transformations construct exponential functions by using a graph, a description or two points create equations and solve problems involving exponential growth and decay transform and interpret expressions of exponential functions by applying the properties of exponents identify and generate geometric sequences relate geometric sequences to exponential function use a recursive formula to list terms in a sequence write recursive formulas for arithmetic and geometric sequences

Interdisciplinary Connections:

Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

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

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Stage 2: Assessment Evidence	
Performance Task(s): **Unit 3 Activities/Videos:** A.CED.A.3 Dimes and Quarters A.SSE.A.1 Mixing Candies F.IF.A.2 Yam in the oven F.IF.B.4 Words-Tables-Graphs F.IF.B.4 The Aquarium F.IF.B.5 Average Cost F.IF.C.7a Graphs of Quadratic Functions N.RN.B.3 Rational and Irrational Numbers	**Other Evidence:** Written and Online Assignments Exit Cards Cornell Notes CFA's (common formative assessments) Mid Chapter Quizzes End of Chapter Assessments End of Unit Common Assessments

Stage 3: Learning Plan	
Learning Opportunities/Strategies: Lesson 6.1 graph systems of equations Graph two or more equations, find the point of intersection for a set of equations, identify the point of intersection as a solution to a system Lesson 6.2 substitution Isolate a variable in a formula, substitute an expression into a variable, solve an equation Lesson 6.3 elimination using addition and subtraction Combine like terms to cancel out a variable, find the solution to a system of equations Lesson 6.4 elimination using multiplication Find the least common multiple of a set of numbers, use distributive property to manipulate equations, combine like terms and solve a linear system Lesson 6.5 applying systems of linear equations Apply linear systems to real world situations, determine the best method to use for solving linear systems (graphing, combination, elimination) Lesson 6.6 systems of inequalities	**Resources:** Glencoe Algebra 1 Textbook (Chapters 6 and 7) IXL Edulastic Kahoot Classkick NJSLA Digital Library Khan Academy Lesson Presentations and Videos Graphing Calculator Desmos Google Apps for Education Illuminations.nctm.org Padlet Inclusive Math Class GLSEN Educator Resources

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Solve a system of inequalities, determine which regions of the graph to shade, identify the solutions to the system (which may be none, one or infinite) Lesson 7.1 multiplication properties of exponents Multiply exponential expressions, apply powers of exponents, understand rules of exponents (multiply coefficients, add exponents) Lesson 7.2 division properties of exponents Divide exponential expressions, apply powers of exponents for division, understand rules of exponents (divide coefficients, subtract exponents) Lesson 7.3 rational exponents Find the square root of rational numbers, find the cubed root of rational numbers, write an expression in radical form Lesson 7.5 exponential functions Graph an exponential function, identify exponential behavior Lesson 7.6 transformations of exponential functions Translate an exponential function, compare the graphs of an exponential function with the same graph transformed Lesson 7.7 writing exponential functions Write an exponential function, solve math problems dealing with exponential growth and decay Lesson 7.8 transforming exponential expressions Solve real world exponential math problems involving a principle payment, time and interest rates Lesson 7.9 geometric sequences as exponential functions Write a geometric sequence formula, determine the nth term of a geometric sequence, graph a sequence on a coordinate plane Lesson 7.10 recursive formulas Write and distinguish between recursive and explicit formulas, analyze patterns and create recursive formulas based on a pattern	

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Differentiation

*Please note: Teachers who have students with 504 plans that require curricular accommodations are to refer to Struggling and/or Special Needs Section for differentiation

High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring Pair student with a high achieving student	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Unit Title: Unit 4: Polynomials and Quadratics (30 days)

Standards & Indicators:

Major:

A.APR.A.1 – understand that polynomials form a system analogous to the integers, namely, they are closed under the arithmetic operations

A.CED.A.1 – create equations and inequalities in one variable and use them to solve problems

A.CED.A.2 – create equations in two or more variables to represent relationships between quantities, graph equations on coordinate axes with labels and scales

A.REI.A.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.

A.REI.B.4 – solve quadratic equations by inspection, taking square roots, completing the square, using the quadratic formula and factoring. Recognize when the quadratic formula gives complex solutions and write them as a+bi for real numbers a and b

A.REI.D.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)

A.REI.D.11 – explain why the x-coordinates of the points where the graphs of two equations y = f(x) and y = g(x) intersect are the solutions of the equations f(x) = g(x). Find the solutions using technology, make tables of values and include cases where the functions are linear, polynomial, rational, absolute value, exponential and logarithmic functions.

A.SSE.A.1 – interpret expressions that represent a quantity in terms of its context such as terms, factors and coefficients

A.SSE.A.2 – use the structure of an expression to identify ways to rewrite it

F.IF.A.2 – use function notation, evaluate functions for inputs in their domains, interpret statements that use function notation in terms of a context

F.IF.B.4 – for a function that models a relationship between two quantities, interpret key features of the graph and tables and sketch graphs given a verbal description of the relationship

F.IF.B.5 – relate the domain of a function to its graph and to the quantitative relationship it describes

F.IF.B.6 – calculate and interpret the average rate of change of a function over a specified interval, estimate rate of change from a graph

Supporting:

A.SSE.B.3 – complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines

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F.IF.8.a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values ,and symmetry of a graph and interpret these in terms of a context.

F.IF.C.7 – graph functions expressed symbolically and show key features of the graph using technology if necessary

F.IF.C.8 – write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function

F.IF.C.9 – compare properties of two functions each represented in a different way (algebraically or graphically)

F.LE.A.1 – prove that linear functions grow by equal differences over equal intervals, exponential functions grow by equal factors over equal intervals

F.LE.A.2 – construct linear and exponential functions, including arithmetic and geometric sequences given a graph or table

F.LE.A.3 – observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly, quadratically or as a polynomial function

F.LE.B.5 – interpret the parameters in a linear or exponential function in terms of a context

N.Q.A.1 – use units to understand problems and formulas, choose and interpret the origin and the scale in graphs and data displays

S.ID.B.5 – summarize categorical data for two categories in two way frequency tables, interpret relative frequencies in the context of the data, recognize possible associations and trends in the data

Additional:

S.ID.A.1 - represent data with plots on the real number line (dot plots, histograms and box plots)

S.ID.A.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 sets of data

S.ID.A.3 – interpret differences in shape, center, spread in the context of the data sets accounting for all possible effects of extreme data points (outliers)

Career Readiness, Life Literacies and Key Skills

Standard	Performance Expectations	Core Ideas
9.4.12.CI.1	Demonstrate the ability to reflect, analyze, and use creative skills and ideas (e.g., 1.1.12prof.CR3a).	With a growth mindset, failure is an important part of success.
9.4.12.CT.1	Identify problem-solving strategies used in the development of an innovative product or practice (e.g., 1.1.12acc.C1b, 2.2.12.PF.3).	Collaboration with individuals with diverse experiences can aid in the problem-solving process, particularly for global issues where diverse

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		solutions are needed.
9.4.12.GCA.1	Collaborate with individuals to analyze a variety of potential solutions to climate change effects and determine why some solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).solutions (e.g., political. economic, cultural) may work better than others (e.g., SL.11-12.1., HS-ETS1-1, HS-ETS1-2, HS-ETS1-4, 6.3.12.GeoGI.1, 7.1.IH.IPERS.6, 7.1.IL.IPERS.7, 8.2.12.ETW.3).	Solutions to the problems faced by a global society require the contribution of individuals with different points of view and experiences different points of view and experiences.

Central Idea / Enduring Understanding:	**Essential/Guiding Question:**
Chapter 8 Polynomials can be added, subtracted, and multiplied. Polynomials can sometimes be factored in problem situations. Quadratic equations can be solved using concrete models, tables, graphs, and algebraic methods. **Chapter 9** Quadratic functions are nonlinear functions and can be written in the form $f(x) = ax^2 + bx + c$. Quadratic equations can be solved by graphing or by using algebraic methods. The quadratic parent function can be used to sketch related graphs. **Chapter 10** Statistics are useful in identifying various sampling techniques, recognizing biased samples, and counting outcomes.	At the end of the Unit, students should be able to answer the Essential Questions: Chapter 8- When could a nonlinear function be used to model a real-world situation? Chapter 9- Why do we use different methods to solve math problems? Chapter 10- How are statistics used in the real world?
Content:	**Skills(Objectives):**
8.1 Adding and Subtracting Polynomials 8.2 Multiplying a Polynomial by a Monomial 8.3 Multiplying Polynomials 8.4 Special Products 8.5 Using the Distributive Property 8.6 Factoring Quadratic Trinomials 8.7 Factoring Special Products 9.1 Graphing Quadratic Equations 9.2 Transformations of Quadratic Equations 9.3 Solving Quadratic Equations by Graphing 9.4 Solving Quadratic Equations by Factoring 9.5 Solving Quadratic Equations by Completing the Square	**Students will be able to:** add a polynomial subtract a polynomial write a polynomial in standard form multiply a polynomial by a monomial solve equations involving the products of monomials and polynomials

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9.6 Solving Quadratic Equations by using the Quadratic Formula 9.7 Solving Systems of Linear and Quadratic Equations 9.8 Analyzing Functions with Successive Differences 10.3 Measures of Spread 10.6 Summarizing Categorical Data **Additional:** 10.1-Measures of Center 10.2-Representatio of Data 10.4-Distribution of Data 10.5-Comparing sets of Data	multiply binomials by using the FOIL method multiply polynomials by using the distributive property find the squares of sums and differences find the product of a sum and a difference use the distributive property to factor polynomials solve an equation in the form ax^2 + bx = 0 factor a trinomial of the form x^2 + bx + c factor a trinomial of the form ax^2 + bx + c factor binomials that are differences of squares factor trinomials that are perfect squares identify the characteristics of graphs of quadratic functions graph a quadratic function apply translations to quadratic functions apply dilations and reflections to quadratic functions solve quadratic equations by graphing estimate solutions of quadratic equations by graphing solve quadratic equations by factoring solve quadratic equations by completing the square identify key features of quadratic functions by writing quadratic equations in vertex form solve quadratic equations by using the quadratic formula solve systems of linear and quadratic equations by graphing solve systems of linear and quadratic equations by using algebraic methods identify linear, quadratic and exponential functions from given data write equations that model data

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Interdisciplinary Connections:

Interdisciplinary connections are integrated in each unit with connections to the mathematical practices.

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

Stage 2: Assessment Evidence

Performance Task(s):

A.APR.A.1 Powers of 11

A.REI.A.1 Zero Product Property

A.REI.B.4 Two Squares are Equal

A.SSE.A.1 Mixing Candles

F.IF.C.8a Springboard Dive

Other Evidence:

Written and Online Assignments
Exit Cards
Cornell Notes
CFA's (common formative assessments)
Mid Chapter Quizzes
End of Chapter Assessments
End of Unit Common Assessments

Stage 3: Learning Plan

Learning Opportunities/Strategies:

Lesson 8.1 Adding and Subtracting Polynomials
Add polynomials, subtract polynomials, line up (and combine) like terms, convert to standard form, apply a subtraction symbol using the distributive property

Lesson 8.2 Multiplying a Polynomial by a Monomial
Multiply monomial and polynomial, utilize the distributive property, utilize rules of exponents

Lesson 8.3 Multiplying Polynomials
Multiply polynomials utilizing the distributive property (the FOIL method), combine like terms

Lesson 8.4 Special Products
Identify special products, find the square of an expression, find the product of a sum and difference

Resources:

Glencoe Algebra 1 Textbook (Chapters 8-10)
IXL
Edulastic
Kahoot
Classkick
NJSLA Digital Library
Khan Academy
Lesson Presentations and Videos
Graphing Calculator
Desmos
Google Apps for Education
Illuminations.nctm.org
Padlet
Inclusive Math Class
GLSEN Educator Resources

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Lesson 8.5 Using the Distributive Property Factor by grouping, factor using the distributive property, solve quadratic equations Lesson 8.6 Factoring Quadratic Trinomials Factor quadratic trinomials using the “magic number method”, factor quadratic trinomials using the “5-step method”, determine which factoring methods to use Lesson 8.7 Factoring Special Products Factor differences of squares, recognize and factor perfect square trinomials Lesson 9.1 Graphing Quadratic Equations Identify characteristics from a graph of a quadratic equation, graph a quadratic function, find maximum and minimum values Lesson 9.2 Transformations of Quadratic Equations Describe and graph a horizontal/vertical translation, describe and graph a vertical/horizontal dilation, describe and graph a reflection Lesson 9.3 Solving Quadratic Equations by Graphing Graph a quadratic with two roots, graph a quadratic with one root, graph a quadratic with no real roots, use discriminates to determine the number of roots for a quadratic equation Lesson 9.4 Solving Quadratic Equations by Factoring Solve a quadratic using the square root method, solve a real world quadratic equation, solve a quadratic equation by factoring Lesson 9.5 Solving Quadratic Equations by Completing the Square Complete a square, solve an equation by completing the square, write functions in vertex form Lesson 9.6 Solving Quadratic Equations by using the Quadratic Formula Use the quadratic formula to solve a quadratic equation, determine which method to use to solve a quadratic equation Lesson 9.7 Solving Systems of Linear and Quadratic Equations	

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Solve a system of equations by graphing, solve a system of equation by algebraic methods Lesson 9.8 Analyzing Functions with Successive Differences Choose a model using graphs, choose a model using differences or ratios, write equations for real world situations Lesson 10.3 Measures of Spread Identify measures of spread such as quartiles, minimum and maximum, analyze the effects of outliers, find the variance and standard deviation, compare two sets of data Lesson 10.6 Summarizing Categorical Data Interpret a two way frequency table, complete a frequency table, understand the difference between frequency and relative frequency, solve real world problems using tables and data	

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High-Achieving Students	On Grade Level Students	Struggling Students	Special Needs/ELL
Khan Academy Project based learning Tablets Challenging problems with higher degree of difficulty Higher order thinking questions Differentiation of pacing and activities Differentiation of learning strategies: visual, auditory, kinetic and cooperative Enrichment and extension Technology connection Practice assignments Puzzle time activities Record and practice journal	Tutoring Tables Graphic organizers Differentiation of learning strategies: visual, auditory, kinetic and cooperative Technology connection Practice Assignments Puzzle time activities Record and practice journal Differentiating the lesson activities Lesson tutorials Skills review handbook	Provide a highly structured, predictable learning environment Provide organizers/study guides Lessons designed to the style of learning that matches the student Cooperative Learning Positive reinforcement Announce test with adequate prep time Lessons presentation available on google classroom Frequent check for understanding Break down task into manageable units One-on-one instruction Tutoring Pair student with a high achieving student	Any student requiring further accommodations and/or modifications will have them individually listed in their 504 Plan or IEP. These might include, but are not limited to: breaking assignments into smaller tasks, giving directions through several channels (auditory, visual, kinesthetic, model), and/or small group instruction for reading/writing ELL supports should include, but are not limited to, the following:: Extended time Provide visual aids Repeated directions Differentiate based on proficiency Provide word banks Allow for translators, dictionaries

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Pacing Guide

Algebra I	Glencoe Math Algebra I	Standards
UNIT 1 Expressions, Equations and Functions (35 days)	**CHAPTERS** Chapter 1: 7 days Chapter 2: 8 days Chapter 3: 20 days Unit 1 Online Assessment: PTHS Alg 1 Unit 1 End of Unit Assessment	A.CED.A.1 A.CED.A.2 A.CED.A.4 A.REI.A.1 A.REI.B.3 A.REI.D.10 A.REI.D.11 A.SSE.A.1 A.SSE.A.2 F.IF.A.1 F.IF.A.2 F.IF.A.3 F.IF.B.4 F.IF.B.5 F.IF.B.6 F.BF.A.1 F.IF.C.7 F.IF.C.9 F.LE.A.1 F.LE.A.2 F.LE.B.5 N.Q.A.2 N.Q.A.3
MP		
UNIT 2 Writing Equations and Inequalities (35 days)	**CHAPTERS** Chapter 4: 15 days Chapter 5: 20 days Unit 2 Online Assessment: PTHS Alg I Unit 2 End of Unit Assessment	A.CED.A.1 A.CED.A.2 A.CED.A.3 A.REI.B.3 A.REI.D.12 F.IF.A.2 S.ID.C.7 S.ID.C.8 S.ID.C.9 F.BF.A.1 F.LE.B.5 N.Q.A.1 S.ID.B.6
MP		

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UNIT 3 Systems and Exponents (35 days)	**CHAPTERS** Chapter 6: 17 days Chapter 7: 18 days Unit 3 Online Assessment: PTHS Alg 1 Unit 3 End of Unit Assessment	A.CED.A.1 A.CED.A.2 A.CED.A.3 A.CED.A.4 A.REI.A.1 A.REI.B.3 A.REI.D.10 A.REI.D.11 A.REI.D.12 A.SSE.A.1 A.SSE.A.2 F.IF.A.1 F.IF.A.2 F.IF.A.3 F.IF.B.4 F.IF.B.5 F.IF.B.6 F.IF.8.b F.BF.A.1 F.IF.C.7 F.IF.C.9 F.LE.A.1 F.LE.A.2 F.LE.B.5 A.REI.5
MP		
UNIT 4 Polynomials & Quadratics, Statistics (30 Days)	**CHAPTERS** Chapter 8: 14 Days Chapter 9: 14 Days Chapter 10: 2 Days Unit Online Assessment: PTHS Alg1 Unit 4 End of Unit Assessment	A.APR.A.1 A.CED.A.1 A.CED.A.2 A.REI.B.4 A.REI.D.10 A.REI.D.11 A.SSE.A.1 A.SSE.A.2 A.SSE.B.3 F.IF.A.2 F.IF.B.4 F.IF.B.5 F.BF.A.1 F.BF.B.3 F.IF.C.8 F.IF.C.9 F.LE.A.2 F.LE.A.3 F.LE.B.5 S.ID.B.5

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