Statewide Framework Document for: 270301

Applied Algebra 1

Standards may be added to this document prior to submission but may not be removed from the framework to meet state credit equivalency requirements. Performance assessments and leadership alignment may be developed at the local level. In order to earn state approval, performance assessments must be submitted within this framework. **This course is eligible for one credit of Algebra 1.** Washington Mathematics Standards (Common Core State Standards) support foundational mathematical knowledge and reasoning. While it is important to develop a conceptual understanding of mathematical topics and fluency in numeracy and procedural skills, teachers should also focus on the application of mathematics to career fields to support the three (3) key shifts of CCSS. The Standards for Mathematical Practice develop mathematical habits of mind and are to be modeled and integrated throughout the course. The details about each mathematical standard can be found at Common Core Mathematics Standards.

School District Name	
Course Title: Applied Algebra 1	**Total Framework Hours:** 180
CIP Code: 270301 ☒ Exploratory ☐ Preparatory	**Date Last Modified:** December 31, 2020
Career Cluster: Science, Technology, Engineering and Math	**Cluster Pathway:** Math and Science
Course Summary: Applied Algebra 1 focuses on the application of mathematics and statistics to the solution of functional problems in fields such as engineering and the applied sciences. The course includes practical application of mathematical concepts such as solving simple equations and inequalities, linear equations, systems of equations, functions, exponents, probability, quadratics, and factoring.	
Eligible for Equivalent Credit in: Math	**Total Number of Units:** 10

Unit 1: Math Processes	**Total Learning Hours for Unit:** 10

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

Possible assessments that come from the CORD Study Guide. Each unit has assessment resources that may include chapter projects, lab data sheets, software-generated assessment, and standardized test response forms. Other ideas for performance tasks are:

- CORD Algebra 1, page 3: *The Ultimate Game.*
- OSPI Segmented Math: *Fitting Rules to Data.*
- Scavenger Hunt (similar to Geocaching): Students create a realistic treasure map for a classmate to follow. The map should demonstrate an accurate understanding of vectors. The actual activity could be done in an open field, in the classroom, or in a gym. If students arrive at the correct marker, they can receive a prize, such as a piece of candy. Alternatively, students may have to navigate to markers that are predetermined with letters on them. As a result of following the path that was mapped for them, students will arrive at the end with a series of letters.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21ˢᵗ Century Leadership Skills.

Example:

   1B.4 View failure as an opportunity to learn; understand that creativity and innovation is a long-term, cyclical process of small successes and frequent mistakes

   2C.5 Reflect critically on learning experiences and processes

   2D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions

   3B.3 Assume shared responsibility for collaborative work, and value the individual contributions made by each team member

Industry Standards and/or Competencies:

Applied Algebra 1 is not industry specific. Algebra 1 is utilized in a vast array of the world's industries. The standards and competencies vary widely throughout these industries. Students discuss and explore careers where the understanding and application of the principals of Algebra 1 are applicable.

Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. HS.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. Use properties of rational and irrational numbers. HS.N.RN.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. HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.

	HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.N.VM.1 (+) Recognize vector quantities as having both magnitude and direction. Represent vector quantities by directed line segments, and use appropriate symbols for vectors and their magnitudes (e.g., v, |v|, ||v||, v). HS.N.VM.2 (+) Find the components of a vector by subtracting the coordinates of an initial point from the coordinates of a terminal point. HS.N.VM.3 (+) Solve problems involving velocity and other quantities that can be represented by vectors. HS.N.VM.4 (+) Add and subtract vectors. HS.N.VM.4a Add vectors end-to-end, component-wise, and by the parallelogram rule. Understand that the magnitude of a sum of two vectors is typically not the sum of the magnitudes. HS.N.VM.4b Given two vectors in magnitude and direction form, determine the magnitude and direction of their sum. HS.N.VM.4c Understand vector subtraction $v - w$ as $v + (-w)$, where $-w$ is the additive inverse of w, with the same magnitude as w and pointing in the opposite direction. Represent vector subtraction graphically by connecting the tips in the appropriate order, and perform vector subtraction component-wise. HS.N.VM.5 (+) Multiply a vector by a scalar. HS.N.VM.5a Represent scalar multiplication graphically by scaling vectors and possibly reversing their direction; perform scalar multiplication component-wise, e.g., as $c(v_x, v_y) = (cv_x, cv_y)$. HS.N.VM.5b Compute the magnitude of a scalar multiple cv using $\|\|cv\|\| = \|c\|v$. Compute the direction of cv knowing that when $\|c\|v \neq 0$, the direction of cv is either along v (for $c > 0$) or against v (for $c < 0$). HS.A.REI.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. HS.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. HS.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. HS.A.REI.4 Solve quadratic equations in one variable. HS.A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)2 = q$ that has the same solutions. Derive the quadratic formula from this form. HS.A.REI.4b Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP4 Model with mathematics.

	MP5 Use appropriate tools strategically.
	MP6 Attend to precision.
	MP7 Look for and make use of structure.
	MP8 Look for and express regularity in repeated reasoning.

Unit 2: Mathematical Expressions	**Total Learning Hours for Unit:** 26

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

Assessments that come from the CORD Study Guide.

- Holt Algebra 1, Chapter 1 Project: *Discovering the Magic*.
- OSPI Segmented Math: *How Fast To Drive?*

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

2A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation

2C.3 Synthesize and make connections between information and arguments

2D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions

3A.5 Communicate effectively in diverse environments (including multi-lingual)

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.RN.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. HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. HS.A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*

	HS.A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.
	HS.A.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
	HS.A.SSE.3c Use the properties of exponents to transform expressions for exponential functions.
	HS.A.SSE.4 Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems.
	HS.A.CED.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.
	HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
	HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
	HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
	HS.A.REI.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.
	HS.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
	HS.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
	HS.A.REI.4 Solve quadratic equations in one variable.
	HS.A.REI.4a Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x - p)2 = q$ that has the same solutions. Derive the quadratic formula from this form.
	HS.A.REI.4b Solve quadratic equations by inspection (e.g., for x2 = 49), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them.
	MP2 Reason abstractly and quantitatively.
	MP4 Model with mathematics.
	MP5 Use appropriate tools strategically.
	MP6 Attend to precision.
	MP7 Look for and make use of structure.
	MP8 Look for and express regularity in repeated reasoning.

Unit 3: Solving Equations	**Total Learning Hours for Unit:** 26

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:

Assessments that come from the CORD Study Guide.

- CORD Algebra 1, page 139: *Nutritious Information*

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

4A.2 Evaluate information critically and competently

4B.1 Use information accurately and creatively for the issue or problem at hand

6A.1 Use technology as a tool to research, organize, evaluate and communicate information

8B.1 Monitor, define, prioritize and complete tasks without direct oversight

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Aligned Washington State Academic Standards	
Mathematics: Common Core	HS.N.RN.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. HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. HS.A.APR.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. HS.A.CED.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. HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

	HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
	HS.A.REI.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.
	HS.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.
	HS.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them.
	MP2 Reason abstractly and quantitatively.
	MP3 Construct viable arguments and critique the reasoning of others.
	MP4 Model with mathematics.
	MP5 Use appropriate tools strategically.
	MP6 Attend to precision.
	MP7 Look for and make use of structure.
	MP8 Look for and express regularity in repeated reasoning.

Unit 4: Solving Inequalities	Total Learning Hours for Unit: 6

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
Assessments that come from the CORD Study Guide.
- Holt Algebra 1, Chapter 3 Project: *For a Good Cause*.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:
2A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
2C.3 Synthesize and make connections between information and arguments
3A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts
9A.1 Know when it is appropriate to listen and when to speak
9B.2 Respond open-mindedly to different ideas and values

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. HS.A.CED.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. HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. HS.A.REI.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. HS.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. HS.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

Unit 5: Linear Equations	**Total Learning Hours for Unit:** 33
Performance Assessments: (Districts to complete for each unit) *Example assessments for this unit include:*	

Assessments that come from the CORD Study Guide.
- OSPI Segmented Math: *Miles Per Gallon.*
- OSPI Segmented Math: *A Salespersons' Dilemma.*

Assessments may also be developed to address the following competencies:
- Translate a problem into an equation.
- Recognize and work with the parts of an equation.
- Simplify and solve an equation.
- Check the solutions of the equation and the problem.
- Identify, write and solve inverse functions.

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:

2A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
2C.3 Synthesize and make connections between information and arguments
3A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts

Industry Standards and/or Competencies:
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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. HS.A.CED.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. HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

	HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.
	HS.A.REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.
	HS.A.REI.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).
	HS.A.REI.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 tables 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.*
	HS.A.REI.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.
	HS.F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) 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) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).
	HS.F.IF.2 Use function notation, evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
	HS.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.
	HS.F.IF.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.*
	HS.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.
	HS.F.IF.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.*
	HS.F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*
	HS.F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.
	HS.F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

	HS.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior. HS.F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior. HS.F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude. HS.F.IF.8 Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. HS.F.IF.8a Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph, and interpret these in terms of a context. HS.F.IF.8b Use the properties of exponents to interpret expressions for exponential functions. HS.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). HS.F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. HS.F.LE.1a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. HS.F.LE.1b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. HS.F.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. HS.F.LE.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). HS.F.LE.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. HS.F.LE.4 For exponential models, express as a logarithm the solution to abct = d where a, c, and dare numbers and the base b is 2, 10, or e; evaluate the logarithm using technology. HS.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context. HS.S.ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision.

| MP7 Look for and make use of structure. | |
| MP8 Look for and express regularity in repeated reasoning. | |

Unit 6: Functions	**Total Learning Hours for Unit:** 18
Performance Assessments: (Districts to complete for each unit)	
Example assessments for this unit include:	
Assessments that come from the CORD Study Guide.	
• Holt Algebra 2, Chapter 1: *As Big As a Whale.*	

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:

    8A.3 Utilize time and manage workload efficiently

    9A.2 Conduct themselves in a respectable, professional manner

    10A.2 Prioritize, plan and manage work to achieve the intended result

    11B.1 Act responsibly with the interests of the larger community in mind

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.Q.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.
	HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.
	HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
	HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.*
	HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.
	HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity.
	HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it.
	HS.A.CED.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.
	HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
	HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.
	HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations.

| | HS.F.IF.1 Understand that a function from one set (called the domain) to another set (called the range) 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) denotes the output of f corresponding to the input x. The graph of f is the graph of the equation y = f(x).

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

HS.F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.

HS.F.IF.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.*

HS.F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.

HS.F.IF.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.*

HS.F.IF.7 Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases.*

HS.F.IF.7a Graph linear and quadratic functions and show intercepts, maxima, and minima.

HS.F.IF.7b Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.

HS.F.IF.7c Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.

HS.F.IF.7d (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.

HS.F.IF.7e Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

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

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

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

HS.F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

HS.F.BF.1 Write a function that describes a relationship between two quantities.*

HS.F.BF.1a Determine an explicit expression, a recursive process, or steps for calculation from a context. |

	HS.F.BF.1b Combine standard function types using arithmetic operations.
HS.F.BF.1c (+) Compose functions.
HS.F.BF.2 Write arithmetic and geometric sequences both recursively and with an explicit formula, use them to model situations, and translate between the two forms.*
HS.F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the grapHS.. 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.
HS.F.BF.4 Find inverse functions.
HS.F.BF.4a Solve an equation of the form $f(x) = c$ for a simple function f that has an inverse and write an expression for the inverse.
HS.F.BF.4b (+) Verify by composition that one function is the inverse of another.
HS.F.BF.4c (+) Read values of an inverse function from a graph or a table, given that the function has an inverse.
HS.F.BF.4d (+) Produce an invertible function from a non-invertible function by restricting the domain.
HS.F.BF.5 (+) Understand the inverse relationship between exponents and logarithms and use this relationship to solve problems involving logarithms and exponents.
HS.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them.
MP2 Reason abstractly and quantitatively.
MP3 Construct viable arguments and critique the reasoning of others.
MP4 Model with mathematics.
MP5 Use appropriate tools strategically.
MP6 Attend to precision.
MP7 Look for and make use of structure.
MP8 Look for and express regularity in repeated reasoning.

Unit 7: System of Equations	**Total Learning Hours for Unit:** 15

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
Assessments that come from the CORD Study Guide.
- Holt Algebra 1, Chapter 6 Project: *Where is the Money?*
- Holt Algebra 2, Chapter 3 Project: *Whooping It Up*
- OSPI Segmented Math: *The Vacation*

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:
    2A.1 Use various types of reasoning (inductive, deductive, etc.) as appropriate to the situation
    2D.2 Identify and ask significant questions that clarify various points of view and lead to better solutions
    3B.1 Demonstrate ability to work effectively and respectfully with diverse teams
    4A.2 Evaluate information critically and competently	

Industry Standards and/or Competencies: Applied Algebra 1 is not industry specific. Algebra 1 is utilized in a vast array of the world's industries. The standards and competencies vary widely throughout these industries. Students discuss and explore careers where the understanding and application of the principals of Algebra 1 are applicable.	
Aligned Washington State Academic Standards	
Mathematics: Common Core	HS.N.Q.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. HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling. HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities. HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.* HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients. HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity. HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it. HS.A.APR.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. HS.A.CED.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. HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context. HS.A.CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. HS.A.REI.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. HS.A.REI.6 Solve systems of linear equations exactly and approximately (e.g., with grapHS.), focusing on pairs of linear equations in two variables. HS.A.REI.7 Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively.

	MP3 Construct viable arguments and critique the reasoning of others.
	MP4 Model with mathematics.
	MP5 Use appropriate tools strategically.
	MP6 Attend to precision.
	MP7 Look for and make use of structure.
	MP8 Look for and express regularity in repeated reasoning.

Unit 8: Attributes of Exponents	**Total Learning Hours for Unit:** 21

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
Assessments that come from the CORD Study Guide.
- Holt Algebra 1, Chapter 7 Project: *Every Second Counts*
- Holt Algebra 1, Chapter 11 Project: *Population Predictions*

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:
    1A.1 Use a wide range of idea creation techniques (such as brainstorming)
    1B.3 Demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas
    2B.1 Analyze how parts of a whole interact with each other to produce overall outcomes in complex systems
    3A.1 Articulate thoughts and ideas effectively using oral, written and nonverbal communication skills in a variety of forms and contexts

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
	HS.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents. Use properties of rational and irrational numbers.
	HS.N.Q.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.
	HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.
	HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
	HS.F.LE.5 Interpret the parameters in a linear or exponential function in terms of a context.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them.

	MP2 Reason abstractly and quantitatively.
	MP3 Construct viable arguments and critique the reasoning of others.
	MP4 Model with mathematics.
	MP5 Use appropriate tools strategically.
	MP6 Attend to precision.
	MP7 Look for and make use of structure.
	MP8 Look for and express regularity in repeated reasoning.

Unit 9: Probability	**Total Learning Hours for Unit:** 10

Performance Assessments: (Districts to complete for each unit)

Example assessments for this unit include:
- Solve a variety of real-world probability problems that include mathematical computation, hands-on practice with a variety of manipulatives, group projects, and practice using multiple problem-solving techniques.

Assessments may also be developed to address the following competencies:
- Find the probability of some simple events.
- Count the number of ways an event can happen.
- Draw diagrams and charts to help find probability.
- Use a calculator to find probabilities.

Leadership Alignment: (Districts to complete for each unit)

Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.

Example:
- 3B.1 Demonstrate ability to work effectively and respectfully with diverse teams
- 9A.1 Know when it is appropriate to listen and when to speak
- 10B.1 Demonstrate additional attributes associated with producing high quality products

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.S.IC.1 Understand statistics as a process for making inferences about population parameters based on a random sample from that population.
	HS.S.IC.3 Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.
	SHS.S.IC.6 Evaluate reports based on data.
	HS.S.CP.1 Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

	HS.S.CP.2 Understand that two events A and B are independent if the probability of A and B occurring together is the product of their probabilities, and use this characterization to determine if they are independent. HS.S.CP.3 Understand the conditional probability of A given B as P(A and B)/P(B), and interpret independence of A and B as saying that the conditional probability of A given B is the same as the probability of A, and the conditional probability of B given A is the same as the probability of B. HS.S.CP.4 Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities HS.S.CP.5 Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. HS.S.CP.6 Find the conditional probability of A given B as the fraction of B's outcomes that also belong to A, and interpret the answer in terms of the model. HS.S.CP.7 Apply the Addition Rule, P(A or B) = P(A) + P(B) - P(A and B), and interpret the answer in terms of the model.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.

Unit 10: Quadratics and Factoring	**Total Learning Hours for Unit:** 15

Performance Assessments: (Districts to complete for each unit)
Example assessments for this unit include:
Assessments that come from the CORD Study Guide.
- Holt Algebra 1, Chapter 8 Project: *High Flyers*
- Holt Algebra 1, Chapter 9 Project: *Free Falling*

Leadership Alignment: (Districts to complete for each unit)
Leadership alignment must include a unit specific project/activity that aligns with the 21st Century Leadership Skills.
Example:
    1A.3 Elaborate, refine, analyze and evaluate their own ideas in order to improve and maximize creative efforts
    1B.3 Demonstrate originality and inventiveness in work and understand the real-world limits to adopting new ideas
    2C.3 Synthesize and make connections between information and arguments

3B.2 Exercise flexibility and willingness to be helpful in making necessary compromises to accomplish a common goal	

Industry Standards and/or Competencies:

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Aligned Washington State Academic Standards

Mathematics: Common Core	HS.N.RN.1 Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents.
	HS.N.RN.2 Rewrite expressions involving radicals and rational exponents using the properties of exponents.
	HS.N.Q.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.
	HS.N.Q.2 Define appropriate quantities for the purpose of descriptive modeling.
	HS.N.Q.3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.
	HS.A.SSE.1 Interpret expressions that represent a quantity in terms of its context.*
	HS.A.SSE.1a Interpret parts of an expression, such as terms, factors, and coefficients.
	HS.A.SSE.1b Interpret complicated expressions by viewing one or more of their parts as a single entity.
	HS.A.SSE.2 Use the structure of an expression to identify ways to rewrite it.
	HS.A.SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.*
	HS.A.SSE.3a Factor a quadratic expression to reveal the zeros of the function it defines.
	HS.A.SSE.3b Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines.
	HS.A.SSE.3c Use the properties of exponents to transform expressions for exponential functions.
	HS.A.APR.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.
	HS.A.APR.2 Know and apply the Remainder Theorem: For a polynomial p(x) and a number a, the remainder on division by x - a is p(a), so p(a) = 0 if and only if (x - a) is a factor of p(x).
	HS.A.APR.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.
	HS.A.CED.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.
	HS.A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.
	HS.A.CED.3 Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or nonviable options in a modeling context.

	HS.A.REI.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. HS.A.REI.2 Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise. HS.F.LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions. HS.F.LE.1a Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals. HS.F.LE.1b Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. HS.F.LE.1c Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. HS.F.LE.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). HS.F.LE.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.
Mathematical Practices	MP1 Make sense of problems and persevere in solving them. MP2 Reason abstractly and quantitatively. MP3 Construct viable arguments and critique the reasoning of others. MP4 Model with mathematics. MP5 Use appropriate tools strategically. MP6 Attend to precision. MP7 Look for and make use of structure. MP8 Look for and express regularity in repeated reasoning.