Math I

Conceptual Category ***Number and Quantity N***

Domain ***Quantities Q***

Cluster ***Reason quantitatively and use units to solve problems.***

Pacing

1st Quarter

Standards

N-Q1 Use units as a way to understand problems and to guide the solution of multistep problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

Learning Targets

I can:

- Select and use appropriate units of measurement for problems with and without context.
- Given a graph, draw conclusions and make inferences.
- Choose appropriate scales to create linear and exponential graphs.
- Determine from the labels on a graph what the units of the rate of change are (e.g., gallons per hour).

N-Q2 Define appropriate quantities for the purpose of descriptive modeling.

Learning Targets

I can:

- Choose appropriate measures and units for problem situations.
- Create a relationship among different units (i.e., feet per second, bacteria per hour, miles per gallon).

N-Q3 Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Learning Targets

I can:

- Determine whether whole numbers, fractions, or decimals are most appropriate.
- Determine the appropriate power of ten to reasonably measure a quantity.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

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- Determine the resulting accuracy in calculations.
- Determine what level of rounding should be used in a problem situation.

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Fluency Recommendations

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Content Vocabulary

- scale (N.Q.1)
- origin (N.Q.1)
- units of measurement (N.Q.1)

- descriptive model (N.Q.2)
- unit rate (N.Q.2)
- modeling (N.Q.2)
- quantity (N.Q.2)
- unit conversion (N.Q.2)
- proportion (N.Q.2)
- ratio (N.Q.2)

- accuracy (N.Q.3)
- precision (N.Q.3)

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Academic Vocabulary

- interpret

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Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

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Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

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Math I

Resources	Enrichment Strategies
• Mathematics Vision Project • PARCC Model Content Framework	
Integrations	**Intervention Strategies**
• Modeling projects	

Math I

Conceptual Category ***Algebra A***

Domain ***Seeing Structure in Expressions SSE***

Cluster ***Interpret the structure of expressions.***

Pacing

2nd Quarter

Standards

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

a. Interpret parts of an expression, such as terms, factors, and coefficients.

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

Learning Targets

I can:

- Given an expression, identify the terms, bases, exponents, coefficients, and factors.
- Determine the real world context of the variables in an expression.
- Identify the individual factors of a given term within an expression.
- Explain the context of different parts of a formula.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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Math I

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Content Vocabulary • exponents • factors • terms • bases • coefficients • expression	**Academic Vocabulary** • interpret
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Framework	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***

Domain ***Seeing Structure in Expressions SSE***

Cluster ***Write expressions in equivalent forms to solve problems.***

Pacing

2nd Quarter

Standards

A-SSE.3 Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression.

c. Use the properties of exponents to transform expressions for exponential functions. *For example, the expression* $1.15t$ *can be rewritten as* $(1.151/12)12t \approx 1.01212t$ *to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

Learning Targets

I can:

- Define an exponential function, $f(x) = abx$.
- Rewrite exponential functions using the properties of exponents.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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Content Vocabulary • exponents • terms • bases • coefficients • expression • zeros • function, exponential function	**Academic Vocabulary** • produce • transform
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Framework	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***

Domain ***Creating Equations CED***

Cluster ***Create equations that describe numbers or relationships.***

Pacing

1st and 2nd Quarters

Standards

A-CED.1 Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and exponential functions.

Learning Targets

I can:

- Create one-variable linear equations and inequalities from contextual situations (stories).
- Create one-variable exponential equations and inequalities from contextual situations (stories).
- Solve and interpret the solution to multistep linear equations and inequalities in context.
- Use properties of exponents to solve and interpret the solution to exponential equations and inequalities in context.

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

Learning Targets

I can:

- Write and graph an equation to represent a linear relationship.
- Write and graph an equation to represent an exponential relationship.
- Model a data set using an equation.
- Choose the best form of an equation to model linear and exponential functions.

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. *For example, represent*

Content Elaborations

Standards of Mathematical Practice

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From the K-8 Math Standards Progression.

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

Learning Targets

I can:

- Determine whether a point is a solution to an equation or inequality.
- Determine whether a solution has meaning in real-world context.
- Write and graph equations and inequalities representing constraints in contextual situations.

A-CED.4 Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. *For example, rearrange Ohm's law $V = IR$ to highlight resistance R.*

Learning Targets

I can:

- Extend the concepts used in solving numerical equations to rearranging formulas for a particular variable.

Fluency Recommendations

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Content Vocabulary

- constant, variable
- dependent variable, independent variable
- inequality
- +, <, >, ≤, ≥
- greater than, less than
- at most, at least
- no more than, no less than
- domain, range
- scale
- constraint
- viable
- formula
- literal equation

Academic Vocabulary

- contextual
- create

Formative Assessments

- performance tasks
- pretests

Summative Assessments

- MVP assessments
- Teacher created assessments

• quizzes • interviews	• PARCC
Resources • Mathematics Vision Project • PARCC Model Content Framework	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***	
Domain ***Reasoning with Equations and Inequalities REI***	
Cluster ***Understand solving equations as a process of reasoning and explain the reasoning.***	**Pacing** **1st Quarter**
Standards **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.** **Learning Targets** **I can:** • Understand, apply, and explain the results of using inverse operations. • Justify the steps in solving equations by applying and explaining the properties of equality, inverse, and identity. • Use the names of the properties and common sense explanations to explain the steps in solving an equation.	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 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. **From the K-8 Math Standards Progression.** **Key Advances from Grades K-8** • Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities. • Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions. • Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles. • Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

Math I

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Content Vocabulary • constant • coefficient • properties of operations • properties of equalities • like terms • variable • evaluate • justify • viable	**Academic Vocabulary** • asserted
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***	
Domain ***Reasoning with Equations and Inequalities REI***	
Cluster ***Solve equations and inequalities in one variable.***	**Pacing** **1st Quarter**
Standards **A-REI.3 Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.** **Learning Targets** **I can:** • Write equations in equivalent forms to solve problems. • Analyze and solve literal equations for a specified variable. • Understand and apply the properties of inequalities. • Verify that a given number or variable is a solution to the equation or inequality. • Interpret the solution of an inequality in real terms.	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 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. **From the K-8 Math Standards Progression.** **Key Advances from Grades K-8** • Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities. • Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions. • Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles. • Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

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Content Vocabulary	**Academic Vocabulary** • interpret
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***

Domain ***Reasoning with Equations and Inequalities REI***

Cluster ***Solve systems of equations.***

Pacing

1st Quarter

Standards

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.

Learning Targets

I can:

- Explain the use of the multiplication property of equality to solve a system of equations.
- Explain why the sum of two equations is justifiable in the solving of a system of equations (property of equality).
- Relate the process of linear combinations with the process of substitution for solving a system of linear equations.

A-REI.6 Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables.

Learning Targets

I can:

- Solve a system of equations exactly (with algebra) and approximately (with graphs).
- Test a solution to the system in both original equations (both graphically and algebraically).
- Analyze a system of equations using slope to predict one, infinitely many, or no solutions.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.
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Content Vocabulary • elimination by multiplication and/or addition • substitution • system of equations • consistent and inconsistent systems • dependent and independent systems • solution set	**Academic Vocabulary** • interpret
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Algebra A***

Domain ***Reasoning with Equations and Inequalities REI***

Cluster ***Represent and solve equations and inequalities graphically.***

Pacing

2nd and 3rd Quarters

Standards

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).

Learning Targets

I can:

- Identify solutions and non-solutions of linear and exponential equations.
- Graph points that satisfy linear and exponential equations.
- Understand that a continuous curve or line contains an infinite number of solutions.

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 or exponential.

Learning Targets

I can:

- Approximate solutions to systems of two equations using graphing technology.
- Approximate solutions to systems of two equations using tables of values.
- 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 $f(x) = g(x)$.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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Math I

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.

Learning Targets

I can:

- Graph the solution to linear inequalities in two variables.
- Graph the solution to systems of linear inequalities in two variables.
- Identify the solutions as a region of the plane.

Fluency Recommendations

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Content Vocabulary

- ordered pair
- coordinate plane
- solution
- non-solution
- sets
- function
- intersection
- approximate
- linear
- exponential
- f(x), g(x)
- inequality
- half-plane
- solution region

Academic Vocabulary

- systems

Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

Math I

Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Functions F***

Domain ***Interpreting Functions IF***

Cluster ***Understand the concept of a function and use function notation.***

Pacing

3rd Quarter

Standards

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 $y = f(x)$.

Learning Targets

I can:

- Understand the definition of a function.
- Identify functions, including functions represented in equations, tables, graphs, or context.
- Distinguish between domain and range.
- Write a relation in function notation.

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.

Learning Targets

I can:

- Write equations using function notation.
- Use function notation to evaluate functions for given inputs in the domain, including combinations and compositions of functions.
- Use function notation to express relationships between contextual variables.

F.IF.3 Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. *For example, the Fibonacci sequence is defined recursively by $f(0) = f(1) = 1$, $f(n+1) = f(n) + f(n-1)$ for $n \geq 1$.*

Content Elaborations

Standards of Mathematical Practice

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1. Make sense of problems and persevere in solving them.
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3. Construct viable arguments and critique the reasoning of others.
4. Model with mathematics
5. Use appropriate tools strategically.
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From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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Math I

Learning Targets

I can:

- Recognize that sequences are functions.
- Define and express a recursive sequence as a function.
- Recognize that a sequence has a domain which is a subset of integers.
- Generate a sequence given a recursive function.

Fluency Recommendations

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Content Vocabulary

- domain
- range
- function
- input
- output
- corresponding
- set
- element
- function
- notation
- evaluate
- recursive
- sequence
- functions
- domain
- subset

Academic Vocabulary

- express
- compositions
- combinations

Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

Resources

- Mathematics Vision Project
- PARCC Model Content Frameworks

Enrichment Strategies

Integrations

- Modeling projects

Intervention Strategies

Math I

Conceptual Category ***Functions F***

Domain ***Interpreting Functions IF***

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

Pacing

2nd and 3rd Quarters

Standards

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; and intervals where the function is increasing, decreasing, positive, or negative.

Learning Targets

I can:

- Given a graph, identify key features such as x- and y-intercepts; intervals where the function is increasing, decreasing, positive, or negative.
- Given a table of values, identify key features such as x- and y-intercepts; intervals where the function is increasing, decreasing, positive, or negative.
- Find key features of a function and use them to graph the function.
- Use interval notation and symbols of inequality to communicate key features of graphs.

F.IF.5 Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes. *For example, if the function $h(n)$ gives the number of person-hours it takes to assemble n engines in a factory, then the positive integers would be an appropriate domain for the function.*

Learning Targets

I can:

- Identify domains of functions given a graph.
- Graph a function, given a restricted domain.
- Identify reasonability of a domain in a particular context.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
- Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions.
- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

Math I

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.

Learning Targets

I can:

- Calculate rate of change given a linear function, from the equation or a table.
- Calculate rate of change over a given interval in an exponential function from an equation or a table where the domain is a subset of the integers.
- Use a graph to estimate the rate of change over an interval in a linear or exponential function.

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

G High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs).

S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Content Vocabulary

- increasing
- decreasing
- positive
- negative
- intervals
- intercepts
- interval notation
- domain
- function
- integers
- independent variable
- dependent variable
- rate of change
- average
- function
- interval

Academic Vocabulary

- interpret
- relate

Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

Resources

- Mathematics Vision Project
- PARCC Model Content Frameworks

Enrichment Strategies

Integrations

- Modeling projects

Intervention Strategies

Math I

Conceptual Category ***Functions F***

Domain ***Interpreting Functions IF***

Cluster ***Analyze functions using different representations.***

Pacing

1st Quarter

Standards

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.

a. Graph linear and quadratic functions and show intercepts, maxima, and minima.
b. Graph square root, cube root, and piecewise-defined functions, including step functions and absolute value functions.
c. Graph polynomial functions, identifying zeros when suitable factorizations are available, and showing end behavior.
d. (+) Graph rational functions, identifying zeros and asymptotes when suitable factorizations are available, and showing end behavior.
e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

Learning Targets

I can:

- Graph linear functions and quadratic functions (with or without technology) given an explanation, and show key features such as intercepts, maxima, and minima.
- Graph square root, cube root, step (or greatest integer), absolute value, and piecewise defined functions.

F.IF.9 Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions). *For example, given a graph of one quadratic function and an algebraic expression for another, say which has the larger maximum.*

Learning Targets

I can:

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

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- Compare and contrast key features of various functions including differences in domain and range, intercepts, and rates of change.
- Compare and contrast two functions (linear and exponential and/or quadratic) when each is represented differently (algebraically, graphically, numerically in tables, or by verbal description).

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Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

G High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs).

S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

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Content Vocabulary

- function
- domain
- linear function
- quadratic function

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Academic Vocabulary

- evaluate
- maximum
- minimum

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Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

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Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

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Resources

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- PARCC Model Content Frameworks

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Enrichment Strategies

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Integrations

- Modeling projects

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Intervention Strategies

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Math I

Conceptual Category ***Functions F***

Domain ***Building Functions BF***

Cluster ***Build a function that models a relationship between two quantities.***

Pacing

2nd and 4th Quarters

Standards

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

a. Determine an explicit expression, a recursive process, or steps for calculation from a context.

b. Combine standard function types using arithmetic operations. *For example, build a function that models the temperature of a cooling body by adding a constant function to a decaying exponential, and relate these functions to the model.*

Learning Targets

I can:

- Given a linear or exponential context, find an expression, recursive process, or steps to model a context with mathematical representations.
- Combine linear and/or exponential functions using addition, subtraction, multiplication, and division.

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.

Learning Targets

I can:

- Write arithmetic sequences both recursively and with an explicit formula.
- Write geometric sequences both recursively and with an explicit formula.
- Model contextual situations with arithmetic or geometric sequences.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
- Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions.
- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

Math I

	Fluency Recommendations **A/G** High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables). **G** High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs). **S** Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.
Content Vocabulary • function • intercepts • explicit expression • recursive • arithmetic sequence • geometric sequence • recursive • explicit	**Academic Vocabulary**
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Functions F***

Domain ***Building Functions BF***

Cluster ***Build new functions from existing functions.***

Pacing

4th Quarter

Standards

F.BF.3 Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$ 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.

Learning Targets

I can:

- Perform vertical translations on linear and exponential graphs.
- Find the value of k given $f(x)$ replaced by $f(x) + k$ on a graph of a linear or exponential function.
- Relate the vertical translation of a linear function to its y-intercept.
- Describe what will happen to a function when $f(x)$ is replaced by $f(x) + k$.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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Math I

	Fluency Recommendations **A/G** High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables). **G** High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs). **S** Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.
Content Vocabulary • translation • transformation • y-intercept • vertical shift	**Academic Vocabulary**
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Functions F***

Domain ***Linear, Quadratic, and Exponential Models LE***

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

Pacing

2nd Quarter

Standards

F-LE.1 Distinguish between situations that can be modeled with linear functions and with exponential functions.

a. Prove that linear functions grow by equal differences over equal intervals, and that exponential functions grow by equal factors over equal intervals.
b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another.
c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another.

Learning Targets

I can:

- Justify the fact that linear functions grow by equal difference over equal intervals using tables and graphs.
- Justify the fact that exponential functions grow by equal factors over equal intervals using tables and graphs.
- Recognize situations that can be modeled linearly or exponentially and describe the rate of change per unit as constant or the growth factor as a constant percent.

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).

Learning Targets

I can:

- Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph.
- Construct linear and exponential functions, including arithmetic and

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

geometric sequences, given the description of a relationship.

- Construct linear functions, including arithmetic sequences, given input-output pairs, including those in a table.

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.

Learning Targets

I can:

- Observe that a quantity increasing exponentially eventually exceeds a quantity increasing linearly using graphs and tables.

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

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S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Content Vocabulary

- exponential
- linear
- arithmetic
- geometric
- sequences
- relationship
- input-output
- function
- difference
- interval
- rate
- factors
- constant rate of change
- percent rate per unit

Academic Vocabulary

Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

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Intervention Strategies

Math I

Conceptual Category ***Functions F***	
Domain ***Linear, Quadratic, and Exponential Models LE***	
Cluster ***Interpret expressions for functions in terms of the situation they model.***	**Pacing** **1st and 2nd Quarters**
Standards **F-LE.5 Interpret the parameters in a linear or exponential function in terms of a context.** **Learning Targets** **I can:** • Interpret the slope and x- and y-intercepts in a linear function in terms of a context. • Interpret the base value and vertical shifts in an exponential function of the form $f(x) = bx + k$, where b is an integer and k can equal zero. • Interpret the base value and initial value in an exponential function of the form $f(x) = abx$, where b is an integer and a can be any positive integer, including 1.	**Content Elaborations** **Standards of Mathematical Practice** ***Mathematically proficient students:*** 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. **From the K-8 Math Standards Progression.** **Key Advances from Grades K-8** • Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities. • Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions. • Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles. • Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

Math I

	Fluency Recommendations **A/G** High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables). **G** High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs). **S** Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.
Content Vocabulary • linear • exponential • parameters	**Academic Vocabulary** • interpret
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Statistics and Probability S***

Domain ***Interpreting Categorical and Quantitative Data ID***

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

Pacing

4th Quarter

Standards

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

Learning Targets

I can:

- Graph numerical data on a real number line using dot plots, histograms, and box plots.
- Describe and give a simple interpretation of a graphical representation of data.
- Determine which type of data plot would be most appropriate for a specific situation.

S-ID.2 Use statistics appropriate to the shape of the data distribution to compare center (median, mean) and spread (interquartile range, standard deviation) of two or more different data sets.

Learning Targets

I can:

- Given two sets of data or two graphs, identify similarities and differences in shape, center, and spread.
- Compare data sets and be able to summarize the similarities and differences between the shape and measures of centers and spreads of the data sets.

S-ID.3 Interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers).

Learning Targets

I can:

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

- Given two sets of data or two graphs, identify similarities and differences in shape, center, and spread.
- Interpret similarities and differences between the shape and measures of centers and spreads of data sets.
- State the effects of any existing outliers.

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

G High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs).

S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Content Vocabulary

- dot plot (S.ID.1)
- histogram (S.ID.1)
- box plot (S.ID.1)
- quartiles (S.ID.1)
- lower extreme (minimum) (S.ID.1)
- upper extreme (maximum) (S.ID.1)
- median (S.ID.1)
- outlier (S.ID.1)

- mean (S.ID.2)
- median (S.ID.2)
- interquartile range (S.ID.2)
- standard deviation (S.ID.2)
- center (S.ID.2)
- spread (S.ID.2)
- shape (S.ID.2)

- extreme data point (outliers) (S.ID.3)
- skewed (S.ID.3)

Academic Vocabulary

- interpret

• center (S.ID.3) • spread	
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Statistics and Probability S***

Domain ***Interpreting Categorical and Quantitative Data ID***

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

Pacing

4th Quarter

Standards

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

Learning Targets

I can:

- Create a two-way frequency table showing the relationship between two categorical variables.
- Find and interpret joint, marginal, and conditional relative frequencies.
- Analyze possible associations and trends in the data.

S-ID.6 Represent data on two quantitative variables on a scatter plot, and describe how the variables are related.

a. 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.
b. Informally assess the fit of a function by plotting and analyzing residuals.
c. Fit a linear function for a scatter plot that suggests a linear association.

Learning Targets

I can:

- Create a scatter plot of bivariate data and estimate a linear or exponential function that fits the data and use this function to solve problems in the context of the data.
- Find residuals using technology and analyze their meaning.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Fit a linear function (trend line) to a scatter plot with and without technology.

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Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

G High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs).

S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

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Content Vocabulary

- categorical data (S.ID.5)
- two-way frequency table (S.ID.5)
- relative frequency (S.ID.5)
- joint frequency (S.ID.5)
- marginal frequency (S.ID.5)
- conditional relative frequencies (S.ID.5)
- trends (S.ID.5)

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Academic Vocabulary

- summarize
- interpret
- represent

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Formative Assessments

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Resources

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Math I

Conceptual Category ***Statistics and Probability S***

Domain ***Interpreting Categorical and Quantitative Data ID***

Cluster ***Interpret linear models.***

Pacing

4th Quarter

Standards

S-ID.7 Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data.

Learning Targets

I can:

- Explain what the slope means in the context of the situation.
- Explain what the intercept means in context of the data.

S-ID.8 Compute (using technology) and interpret the correlation coefficient of a linear fit.

Learning Targets

I can:

- Compute the correlation coefficient of a set of linearly related data using technology.
- Determine whether the correlation coefficient shows a weak positive, strong positive, weak negative, strong negative, or no correlation.

S-ID.9 Distinguish between correlation and causation.

Learning Targets

I can:

- Understand the difference between correlation and causation.
- Understand and explain that a strong correlation does not mean causation.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
- Students formalize their understanding of the definition of a function, particularly their understanding of linear functions, emphasizing the structure of linear expressions. Students also begin to work on exponential functions, comparing them to linear functions.
- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
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Math I

	Fluency Recommendations **A/G** High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables). **G** High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs). **S** Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.
Content Vocabulary • slope (rate of change) (S.ID.7) • intercept linear model (S.ID.7) • correlation coefficient (S.ID.8) • linear fit (S.ID.8) • positive correlation (S.ID.8) • negative correlation (S.ID.8) • no correlation (S.ID.8) • correlation (S.ID.9) • causation (S.ID.9)	**Academic Vocabulary** • interpret • context • compute • distinguish
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC

Math I

Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category *Geometry G*

Domain *Congruence CO*

Cluster ***Experiment with transformations in the plane.***

Pacing

3rd Quarter

Standards

G-CO.1 Know precise definitions of angle, circle, perpendicular line, parallel line, and line segment, based on the undefined notions of point, line, distance along a line, and distance around a circular arc.

Learning Targets

I can:

- Define angle, circle, perpendicular line, parallel line, and line segment.
- Use precise definitions to identify and model an angle, circle, perpendicular line, parallel line, and line segment.
- Demonstrate mathematical notation for each term.

G-CO.2 Represent transformations in the plane using, e.g., transparencies and geometry software; describe transformations as functions that take points in the plane as inputs and give other points as outputs. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

Learning Targets

I can:

- Represent reflections, rotations, and translations using a variety of media.
- Compare and contrast rigid and non-rigid transformations.
- Understand transformations as functions that take points in the plane as inputs and give other points as outputs.

G-CO.3 Given a rectangle, parallelogram, trapezoid, or regular polygon, describe the rotations and reflections that carry it onto itself.

Learning Targets

I can:

- Describe and identify lines and points of symmetry.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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- Work with congruence and similarity motions that started in grades 6-8 progresses. Students also consider sufficient conditions for congruence of triangles.
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- Describe rotations and reflections which take a rectangle, parallelogram, trapezoid, or regular polygon onto itself.

G-CO.4 Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

Learning Targets

I can:

- Through observations and conjectures develop definitions of rotations, reflections, and translations.
- Define rotations, reflections, and translations using angles, circles, perpendicular lines, parallel lines, and line segments.

G-CO.5 Given a geometric figure and a rotation, reflection, or translation, draw the transformed figure using, e.g., graph paper, tracing paper, or geometry software. Specify a sequence of transformations that will carry a given figure onto another.

Learning Targets

I can:

- Perform rotations, reflections, and translations using a variety of methods.
- Identify the sequence of transformations that will carry a given figure to another.
- Understand that the composition of transformations is not commutative.

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

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S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Content Vocabulary

- angle
- circle
- perpendicular line
- parallel line
- line segment
- distance
- arc
- plane
- translation
- preserve
- function in terms of input and output
- rectangle
- parallelogram
- trapezoid
- regular polygon
- symmetry

Academic Vocabulary

- perform

• transformation • reflection • rotation • conjecture • inductive reasoning	
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category *Geometry G*

Domain *Congruence CO*

Cluster ***Understand congruence in terms of rigid motions.***

Pacing

3rd or 4th Quarter

Standards

G-CO.6 Use geometric descriptions of rigid motions to transform figures and to predict the effect of a given rigid motion on a given figure; given two figures, use the definition of congruence in terms of rigid motions to decide if they are congruent.

Learning Targets

I can:

- Transform figures using geometric descriptions of rigid motions.
- Predict the effect of rotating, reflecting, or translating a given figure.
- Justify the congruence of two figures using properties of rigid motions.

G-CO.7 Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.

Learning Targets

I can:

- Identify corresponding parts of two triangles.
- Show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent (CPCTC).

G-CO.8 Explain how the criteria for triangle congruence (ASA, SAS, and SSS) follow from the definition of congruence in terms of rigid motions.

Learning Targets

I can:

- Identify the minimum conditions necessary for triangle congruence (ASA, SAS, and SSS).
- Understand, explain, and demonstrate why ASA, SAS, or SSS are sufficient to show congruence.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.

From the K-8 Math Standards Progression.

Key Advances from Grades K-8

- Students build on previous work with solving linear equations and systems of linear equations in two ways: (a) They extend to more formal solution methods, including attending to the structure of linear expressions, and (b) they solve linear inequalities.
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- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

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- Understand, explain, and demonstrate why SSA and AAA are not sufficient to show congruence.

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Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

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S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

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Content Vocabulary

- rigid motion
- congruent
- rotate
- translate
- reflect
- if and only if (iff)
- corresponding
- ASA
- SAS
- SSS
- AAA
- SSA
- included angle
- included side
- corresponding parts

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Academic Vocabulary

- transform
- predict

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Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

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Summative Assessments

- MVP assessments
- Teacher created assessments
- PARCC

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Resources

- Mathematics Vision Project
- PARCC Model Content Frameworks

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Enrichment Strategies

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Integrations

- Modeling projects

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Intervention Strategies

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Math I

Conceptual Category *Geometry G*

Domain *Congruence CO*

Cluster ***Prove geometric theorems.***

Pacing

3rd Quarter

Standards

G-CO.9 Prove theorems about lines and angles. Theorems include: vertical angles are congruent; when a transversal crosses parallel lines, alternate interior angles are congruent and corresponding angles are congruent; points on a perpendicular bisector of a line segment are exactly those equidistant from the segment's endpoints.

Learning Targets

I can:

- Identify and use properties of congruence and equality (reflexive, symmetric, transitive) in proofs.
- Use theorems, postulates, or definitions to prove theorems about lines and angles.

G-CO.10 Prove theorems about triangles. Theorems include: measures of interior angles of a triangle sum to 180°; base angles of isosceles triangles are congruent; the segment joining midpoints of two sides of a triangle is parallel to the third side and half the length; the medians of a triangle meet at a point.

Learning Targets

I can:

- Use theorems, postulates, or definitions to prove theorems about triangles, including:
  a. Measures of interior angles of a triangle sum to 180 degrees.
  b. Base angles of isosceles triangles are congruent.

G-CO.11 Prove theorems about parallelograms. Theorems include: opposite sides are congruent, opposite angles are congruent, the diagonals of a parallelogram bisect each other, and conversely, rectangles are parallelograms with congruent diagonals.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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.
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From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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Math I

Learning Targets

I can:

- Use theorems, postulates, or definitions to prove theorems about parallelograms, including:
  a. Opposite sides are congruent
  b. Opposite angles are congruent
  c. Diagonals bisect each other
  d. Rectangles are parallelograms with congruent diagonals

Fluency Recommendations

A/G High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables).

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S Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.

Content Vocabulary

- quadrilateral
- parallelogram
- rectangle
- diagonals
- distance formula
- midpoint formula
- slope
- bisector
- congruence properties
- midpoint
- midsegment
- isosceles triangle
- median
- centroid
- coordinate proof
- adjacent
- consecutive/non-consecutive
- Law of Syllogism (Transitive property)
- theorem
- linear pair
- vertical angles
- alternate interior angles
- alternate exterior angles
- same-side interior angles
- corresponding angles
- perpendicular bisector
- supplementary angles
- complimentary angles
- equidistant
- congruent

Academic Vocabulary

Formative Assessments

- performance tasks
- pretests

Summative Assessments

- MVP assessments
- Teacher created assessments

• quizzes • interviews	• PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category ***Geometry G***

Domain ***Congruence CO***

Cluster ***Making geometric constructions.***

Pacing

3rd and 4th Quarters

Standards

G-CO.12 Make formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.). Copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.

Learning Targets

I can:

- Perform the following constructions using a variety of tools and methods: copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- Explain why these constructions result in the desired objects.

G-CO.13 Construct an equilateral triangle, a square, and a regular hexagon inscribed in a circle.

Learning Targets

I can:

- Understand the properties of regular polygons.
- Construct congruent segments and perpendicular lines.

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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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.
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From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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Math I

	Fluency Recommendations **A/G** High school students should become fluent in solving characteristic problems involving the analytic geometry of lines, such as finding the equation of a line given a point and a slope. This fluency can support students in solving less routine mathematical problems involving linearity, as well as in modeling linear phenomena (including modeling using systems of linear inequalities in two variables). **G** High school students should become fluent in using geometric transformation to represent the relationships among geometric objects. This fluency provides a powerful tool for visualizing relationships, as well as a foundation for exploring ideas both within geometry (e.g., symmetry) and outside of geometry (e.g., transformations of graphs). **S** Students should be able to create a visual representation of a data set that is useful in understanding possible relationships among variables.
Content Vocabulary • equilateral triangle • square • regular hexagon • inscribed • construction • segment • angle • bisect • perpendicular • parallel • circle	**Academic Vocabulary** • construct • copy
Formative Assessments • performance tasks • pretests • quizzes • interviews	**Summative Assessments** • MVP assessments • Teacher created assessments • PARCC
Resources • Mathematics Vision Project • PARCC Model Content Frameworks	**Enrichment Strategies**
Integrations • Modeling projects	**Intervention Strategies**

Math I

Conceptual Category *Geometry G*

Domain *Expressing Geometric Properties With Equations GPE*

Cluster ***Use coordinates to prove simple geometric theorems algebraically.***

Pacing

4th Quarter

Standards

G-GPE.4 Use coordinates to prove simple geometric theorems algebraically.
For example, prove or disprove that a figure defined by four given points in the coordinate plane is a rectangle.

Learning Targets

I can:

- Use coordinates to prove simple geometric theorems algebraically, focusing on lines, segments, and angles.
- Prove that points in a plane determine defined geometric figures.

G-GPE.5 Prove the slope criteria for parallel and perpendicular lines and use them to solve geometric problems (e.g., find the equation of a line parallel or perpendicular to a given line that passes through a given point).

Learning Targets

I can:

- Prove that the slopes of parallel lines are equal.
- Prove that the product of the slopes of perpendicular lines is -1.
- Use slope criteria for parallel and perpendicular lines to solve geometric problems.
- Write the equation of a line parallel or perpendicular to a given line, passing through a given point.

G-GPE.7 Use coordinates to compute perimeters of polygons and areas of triangles and rectangles; e.g., using the distance formula.

Learning Targets

I can:

Content Elaborations

Standards of Mathematical Practice

Mathematically proficient students:

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From the K-8 Math Standards Progression.

Key Advances from Grades K-8

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- Work with the bivariate data and scatter plots in grades 6-8 is extended to working with lines of best fit.

- Use the distance formula to compute perimeters of polygons and areas of triangles and rectangles.

Fluency Recommendations

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Content Vocabulary

- perimeter
- polygon
- area
- distance formula
- parallel
- perpendicular
- reciprocal
- altitude
- diagonal
- bisector
- perpendicular bisector
- median
- parallel
- midpoint
- Pythagorean Theorem

Academic Vocabulary

Formative Assessments

- performance tasks
- pretests
- quizzes
- interviews

Summative Assessments

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- PARCC

Resources

- Mathematics Vision Project
- PARCC Model Content Frameworks

Enrichment Strategies

Integrations

- Modeling projects

Intervention Strategies