CV Guarantee
(Integrated Math 1/9th Grade)

Big Idea: Domain and Range

Students will be able to describe the domain and range of a function or graph. Students will relate domain to the input of an equation, and range as the output of the equations.

Standard:

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*).

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.

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

Timeline: Q1 (3 to 5 days)

Key Vocabulary:
domain, range, linear function, x-intercept, y-intercept, x-y table

Vocabulary Activities:
Quizlet.Live
Sentence Frames
Frayer Activity
Kahoot

Knowledge	Reasoning	Performance Skills	Product Examples
I can define the domain and range using mathematical vocabulary. I can relate the domain to the x-axis and the range to the y-axis. I can use function notation.	I can visually identify the correct domain and range from a graph. I can identify if the domain and range apply to specific graphs.	I can evaluate functions for inputs in their domains, and interpret statements that use function notation in terms of a context. I can relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	For a given function *f,* and *x* is an element of its domain, then I can show that *f*(*x*) denotes the output of *f* corresponding to the input *x.*

Resources: CPM – Online textbook with appropriate online tools (Desmos)

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Big Idea: Distinguishing between the area and the perimeter of an algebra tile shape is essential foundational knowledge for using area models in the next lesson to multiply polynomials. Students will use dimensions of algebra tile rectangles and area models to represent expressions and multiplication and will write the area of a composite rectangle as a pair of equivalent expressions, as a sum of its partial areas, and as a product of its dimensions. Students will multiply polynomial expressions and verify the Distributive Property using area models.

Standard:	**Timeline:**
A-SSE.1b. Interpret complicated expressions by viewing one or more of their parts as a single entity. 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.	Q2 (5-8 days)
Key Vocabulary: Area model, binomial, dimensions, equation, expression, polygon, product, solve, sum, trinomial, Distributive Property, polynomial, solution, term	**Vocabulary Activities:** Kahoot Sentence Frames Quizlet

Knowledge	**Reasoning**	**Performance Skills**	**Product Examples**
Students can explain the difference between equation and expression. Students understand how to solve problems using the Distributive Property.	Students can compare the areas of a given area model using their knowledge of the Distributive Property.	I can create an area model given a binomial equation.	I can create an equation for a given Area Model, labeling correct variables, lengths, and sides.

Resources:
CPM eBook,
Algebra Tiles (Physical or eTool)

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Big Idea: Evaluating Expressions/Functions

Students will understand how to evaluate functions when given the x or f(x). Students will rewrite expressions with exponents in equivalent forms. They will look for structure in the equivalent forms to identify shortcuts that will later be formalized into the laws of exponents.

Standard:

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.

- Note: These are considered "Skills to maintain" at this level.

Timeline: Q1 (5 days)

Key Vocabulary: Order of Operations, variable, like-terms, substitution, integers, inverse operation, base, exponent, scientific notation, Giant One, numerator, denominator, negative, positive, and equation.

Vocabulary Activities:
Kahoot.
Quizlet.Live

Knowledge	Reasoning	Performance Skills	Product Examples
I can identify like terms. I can list the Order of Operations. I can identify the base and exponent of an expression.	I can evaluate the expression by performing math functions and combine like-terms.	I can perform the proper math operation to simplified expressions. I can perform the basic math functions in the proper order. I can evaluate expressions that contain exponents.	I can display a simplified expression.

Resources: CPM e-book.

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Big Idea: Linear Equations/Slope Intercept form

Students will look at how slope represents rate of change given a variety of situations. In particular, students will develop an algebraic method for writing the equation of a line when given only two points on the line.

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

Timeline: Q2 (10 – 12 days)

Key Vocabulary:
Delta X, Delta Y, Coefficient, Constant term, Dependent variable, evaluate, Figure 0, function, graph, growth, horizontal line, independent variable, linear equations, negative slope, parameter, positive slope, rate of change, situation, slope, slope triangle, starting value, undefined slope, units, unit rate, variable, x -> y table, x-intercept, y=mx+b, y-intercept, zero slope

Vocabulary Activities:
Quizlet.Live
Sentence Frames
Kahoot

Knowledge	Reasoning	Performance Skills	Product Examples
I can use tables to identify connections between the growth of a pattern, the number of tiles in Figure 0, and its linear equation. I can identify if an equation is written in the form y=mx+b. I can understand speed as a rate.	I can use slope triangles both to compare the relative steepness of lines and to build intuition about positive, negative, and zero slopes. I can investigate the slope of vertical lines.	I can write linear equations relating the figure number of a geometric pattern and its number of tiles. I can solve for the *y*-intercept to write the equation of a line algebraically.	I can develop an algorithm for determining the slope of a line through two points without graphing. I can use my knowledge of $y = mx + b$ to write the equations of lines from two points on a table or graph.

Resources: CPM – Online textbook with appropriate online tools (Desmos)

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<table>
<tr><td colspan="4">Big Idea: Parallel and Perpendicular Lines
Students use their knowledge of rigid transformations to find the slopes of parallel and perpendicular lines. This work is in preparation for work on establishing congruence using parallel and perpendicular lines.</td></tr>
<tr><td colspan="2">Standard:
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).</td><td colspan="2">Timeline: Quarter 2 (8 to 10 Days)</td></tr>
<tr><td colspan="2">Key Vocabulary:

Reciprocal, parallel, perpendicular, slope, y-intercept, slope-intercept form, y = mx+b, terr, linear</td><td colspan="2">Vocabulary Activities:

Quizlet.Live
Sentence Frames
Kahoot</td></tr>
<tr><td>Knowledge</td><td>Reasoning</td><td>Performance Skills</td><td>Product Examples</td></tr>
<tr><td>I can identify the slope of a line from an equation or graph.

I can identify parallel and perpendicular lines from a visual situation.</td><td>I can classify lines – either parallel or perpendicular given an original line.</td><td>I can create a line that is parallel or perpendicular given a specific point and the slope of an original line.</td><td>I can prove two lines are parallel or perpendicular given angles definitions and points on the two respective lines.</td></tr>
<tr><td colspan="4">Resources:
Tracing paper (Patty Paper)
CPM – Online textbook with appropriate online tools (Desmos)
Desmos Classroom Activity – Marbles.</td></tr>
</table>

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Big Idea: Rigid Transformations

Standard: 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. G-CO.4. Develop definitions of rotations, reflections, and translations in terms of 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. 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.	**Timeline:** Q2 (8 days)
Key Vocabulary: dimensions, line of symmetry, polygon, reflection, slope, trinomial, parallel, polynomial, rigid transformations, terms, rotation, translation, degrees (in terms of rotation), plane, axises	**Vocabulary Activities:** Quizlet.Live Sentence Frames Kahoot

Knowledge	Reasoning	Performance Skills	Product Examples
I can identify the names of polygons. I can recognize if a shape has been rotated, reflected or translated once.	I can identify the differences between the rigid transformations.	I can create a reflection about a given line. I can create a rotation about a given point and given the degree of rotation.	I can write the rigid transformations necessary to move an image from one position to a new position.

		I can translate a shape given the units of translation.	
Resources: Tracing paper (Patty Paper) and CPM – Online textbook with appropriate online tools (Desmos)			

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Big Idea: Inequalities

Students will learn how to solve linear inequalities with one variable and how to represent the solutions on a number line. Students will learn how to graph linear inequalities with two variables.

Standard: A-CED.1. Create equations and inequalities in one variable and use them to solve problems. A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. A-REI.3.1 Solve one-variable equations and inequalities involving absolute value, graphing the solutions, and interpreting them in context. 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.	**Timeline:** Q3 (9 days)
Key Vocabulary: Inequality, inequality symbols (<, >, ≤, ≥), graph, number line, solution, coordinates, absolute value, equation, variable, system of inequalities	**Vocabulary Activities:** Quizlet Live Socrative Frayer

Knowledge	Reasoning	Performance Skills	Product Examples
I know all of the inequality symbols by name and meaning. I know the meaning of the absolute value signs	I can determine whether an inequality or an equation is more appropriate for a given word problem.	I can explain how to solve and inequality and justify the steps to do so. I can solve multi-step inequalities to find the	I can represent the solution to an inequality statement on a number line. I can represent the solution to a system of

and how that affects the solution of an inequality.		solution with or without absolute value signs.	inequalities on a coordinate graph with the correct shading.
Resources: CPM – Online textbook with appropriate online tools (DESMOS)			

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Big Idea: Systems of Equations – including substitution, elimination, and graphing

Students will understand how to use substitution, elimination, or graphing to solve systems of linear equations. Students will also recognize the benefits of using a specific method in certain situations.

Standard: A-REI.6. Solve systems of linear equations exactly and approximately (e.g., with graphs), focusing on pairs of linear equations in two variables. 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.	**Timeline:** Q3 (18-20 days)
Key Vocabulary: Substitution, elimination, point of intersection, ordered pair, solution, system of equations, no solution, infinite solutions, parallel lines, x-y table, situation, coordinate graph, equal values method	**Vocabulary Activities:** Quizlet.Live Frayer Activity Kahoot

Knowledge	Reasoning	Performance Skills	Product Examples
I can quickly graph a line that is represented in y=mx + b format. I can write order pairs in the format (x, y) to show my solution. I know the difference between no solution and infinite solutions. I can identify parallel lines.	I can identify the different methods for solving systems of equations and determine which method is best for a specific situation. I can verify mathematically that the solution to a systems of equations problem is accurate.	I can solve a system of equations using substitution. I can solve a system of equations using graphing. I can solve a system of equations using elimination.	I can solve any system of equations problem using one of the three methods: substitution, elimination, graphing, and display my answer in the appropriate form, (x, y).

Resources: CPM – Online textbook with appropriate online tools (Desmos)

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<table>
<tr><td colspan="4">Big Idea: Triangle Congruency Students will review their skills (from a previous course) of determining missing side lengths of similar polygons, identifying congruent polygons, using the Pythagorean Theorem, and using the Triangle Angle Sum Theorem. Students will learn the definition of congruence in terms of rigid transformations. They will then determine if two triangles are congruent by comparing all three corresponding angle measurements and all three corresponding side lengths.</td></tr>
<tr><td colspan="2">Standard:
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.
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.
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.
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.</td><td colspan="2">Timeline: Q4 (15 to 20 days)</td></tr>
<tr><td colspan="2">Key Vocabulary: AAS, ASA, SAS, SAS, SSS, HL, congruent, corresponding parts, similar, scale factor, midpoint, Triangle Angle Sum Theorem, Pythagorean Theorem.</td><td colspan="2">Vocabulary Activities:
Kahoot
Socrative
Sentence Frames</td></tr>
<tr><td>Knowledge</td><td>Reasoning</td><td>Performance Skills</td><td>Product Examples</td></tr>
<tr><td>I can state the Pythagorean Theorem and Triangle Angle Sum Theorem.

I can state the definitions of</td><td>I can identify the differences between ASA, SSS, SAS, HL, and AAS conditions for determining triangle congruence.</td><td>Given two triangles, I can correctly determine whether they are congruent or not, and if congruent, which theorem makes it so.</td><td>I can clearly justify my answers by creating a flowchart to organize my arguments for triangle congruence.</td></tr>
</table>

congruence in terms of rigid transformation.	I can identify the conditions of triangle congruence and correctly identify the congruence.		
Resources: CPM – Online textbook with appropriate online tools (Desmos)			

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Big Idea: Statistics Students will review drawing a line of best fit by hand and writing its equation. They will make predictions based on their linear model and will interpret slope and *y*-intercept in context. Students will calculate probabilities and determine association from data arranged in two-way tables. Students will compare the center, shape, spread, and outliers of two collections of numerical data. Students will calculate and interpret standard deviation.			
Standard: 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. N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret the scale and the origin in graphs and data displays.		**Timeline:** Q4 , (5-8 days)	
Key Vocabulary: Association, line of best fit, model, outliers, predictions, residual, slope, strength (of an association), Venn Diagrams, mean, median, mode, statistic, statistics, two-way table, frequency table, probability, range, scatterplot, standard deviation		**Vocabulary Activities:** Quizlet Live Socrative Sentence Frames Frayer	
Knowledge	**Reasoning**	**Performance Skills**	**Product Examples**
I can tell the differences between graphical representations of single-variable data. I can identify the mode, median, and mean of a given data set. I can recognize trends in the data.	I can identify the residual amount of a given data set. I can find the probability of an event. I can determine whether there was an association between numerical variables and how to	I can correctly fill in a two-way table given some of the data in a word problem. I can collect data in a survey, graph the results, and interpret the frequencies.	I can draw and complete a Venn Diagram given a data set. I can draw the line of best fit given a scatterplot.

	describe that association.		
Resources: CPM – Online textbook with appropriate online tools (Desmos)			

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Big Idea: Sequences – Arithmetic and Geometric Students will represent linear or exponential growth using a diagram, a table, and a graph. Students will write descriptions of linear or exponential growth based on the patterns in their tables, recognize patterns of growth, and use their descriptions to make predictions. Students will look at and compare patterns of growth patterns of sequences using tables and graphs.	
Standard: F-LE.1c. Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. 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. 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). 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. 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.	**Timeline:** Q3 & Q4

F-IF.3. Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers.	
Key Vocabulary: arithmetic sequence, common difference, common ratio, continuous, discrete graph, exponential decay, exponential function, exponential growth, first term, geometric sequence, initial value, linear function, model, multiplier, recursive sequence, sequence, term (of a sequence), term number, zeroth term	**Vocabulary Activities:** Quizlet.Live Frayer Activity Kahoot Sentence frames

Knowledge	**Reasoning**	**Performance Skills**	**Product Examples**
I can identify if a given list of numbers is a sequence or not. I can determine the common ratio for geometric sequences. I can determine the common difference for arithmetic sequences.	I can write descriptions of linear or exponential growth based on the patterns in their tables, recognize patterns of growth, and use my descriptions to make predictions.	I can represent linear or exponential growth using a diagram, a table, and a graph.	I can complete the four representations for linear or exponential sequences.

Resources:
CPM – Online textbook with appropriate online tools (Desmos)