WRAP AROUND:

NQ.Q #1: Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.
NQ.Q #2: Define appropriate quantities for the purpose of descriptive modeling.
NQ.Q #3: Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
UNIT 1 ~ REVIEW & POWERS **EE #1:** Know and apply the properties of integer exponents to generate equivalent numerical expressions. **EE #2**: Use square root and cube root symbols to represent solutions to equations of the form $x^2 = p$ and $x^3 = p$, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that $\sqrt{2}$ is irrational. **EE #3:** Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities, and to express how many times as much one is than the other. **EE #4**: Perform operations with numbers expressed in scientific notation, including problems where	**UNIT 4 ~ LINEAR FUNCTIONS** **A.CE #2:** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. a. Focus on applying linear and simple exponential expressions. **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). **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.	**UNIT 6 ~ QUADRATIC FUNCTIONS** **A.CE #2:** Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales. **b**. Focus on applying simple quadratic expressions. **A.SSE #3:** Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression. **a.** Factor a quadratic expression to reveal the zeros of the function it defines. **b**. Complete the square in a quadratic expression to reveal the maximum or minimum value of the function it defines. **A.REI #4:** Solve quadratic equations in	**UNIT 8 ~ LINEAR SYSTEMS** **A.REI #5**: Verify 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. **A.REI #6:** Solve systems of linear equations algebraically and graphically. a. Limit to pairs of linear equations in two variables. **A.CE. #3:** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. --- **UNIT 9 ~ OTHER SYSTEMS**

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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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1st Nine Weeks	2nd Nine Weeks	3rd Nine Weeks	4th Nine Weeks
both decimal and scientific notation are used. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities. Interpret scientific notation that has been generated by technology. ---------- **UNIT 2 ~ EXPRESSIONS** *(Hypatia)* **MP #3:** Reason abstractly and quantitatively. **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. **A.SSE #2:** Use the structure of an expression to identify ways to rewrite it. **A.SSE #3:** Choose and produce an equivalent form of an expression to reveal and explain properties of the	**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 #3:** Recognize that sequences are functions, sometimes defined recursively, whose domain is a subset of the integers. **F.IF #4:** For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. Key features include: intercepts; intervals where the	one variable. a. Use the method of completing the square to transform any quadratic equation into an equation of the form $(x-p)^2 = q$ that has the same solutions. b. Solve quadratic equations as appropriate to the initial form of the equation by inspection (taking square roots, completing the square, applying the quadratic formula or utilizing the Zero-Product Property after factoring). **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. **b.** Graph quadratic functions and indicate intercepts, maxima, and minima. **F.IF #8:** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **a**. Use the process of factoring and completing the square in a quadratic function to show zeros, extreme values, and symmetry of the graph,	**A.REI #5:** Verify 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. **A.REI #6:** Solve systems of linear equations algebraically and graphically. a. Limit to pairs of linear equations in two variables. **A.REI #7:** Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. ---------- **UNIT 10 ~ PATTERNS** **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.BF #2: Write arithmetic and geometric sequences both recursively and with an explicit formula, use them

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quantity represented by the expression. c. Use properties of exponents to transform expressions for exponential functions. **A.APR #1:** Understand that polynomials form a system analogous to the integers, namely, they are closed under the operations of addition, subtraction, and multiplication; add, subtract, and multiply polynomials. a. Focus on polynomial expressions that simplify to forms that are linear or quadratic. --- **UNIT 3 ~ EQUATIONS & INEQUALITIES** **A.REI #3:** Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters. **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	function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity. **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. **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 functions and indicate intercepts. **F.IF #9:** Compare properties of two functions each represented in a different way. **b.** Focus on linear, quadratic and exponential functions. **F.BF #1:** Write a function that	and interpret these in terms of a context. **F.IF #9:** Compare properties of two functions each represented in a different way. b. Focus on linear, quadratic and exponential functions. **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 context. **F.BF #3:** Identify the effect on the graph of replacing f(x) by f(x) + k, kf(x), f(kx), and f(x + k) for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them. **a.** Focus on transformations of graphs of quadratic functions, except for f(kx). ---	to model situations, and translate between the two forms. --- **Self-Paced, Independent Study** ***(many items will be deleted after 2018-2019 school year)*** *See final two pages for topics and standards.

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has a solution. Construct a viable argument to justify a solution method. **A.CE #1:** Create equations and inequalities in one variable and use them to solve problems. Include equations arising from linear and quadratic functions, and simple rational and exponential functions. **A.CE. #3:** Represent constraints by equations or inequalities, and by systems of equations and/or inequalities, and interpret solutions as viable or non-viable options in a modeling context. **A.CE #4:** Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. --- **REAL NUMBER SYSTEM** *(Article)* *Teach eighth grade standards for the 2018-2019 school year. This unit may be deleted afterwards.	describes a relationship between two quantities. **a.** Determine an explicit expression, a recursive process or steps for calculation from context. **F.BF #4:** Find inverse functions. **a.** Informally determine the input of a function when the output is known. **A.REI #11:** Explain why the x-coordinates of the points where the graphs of the equation y = f(x) and y = g(x) intersect are the solution of the equation f(x) = g(x); find the solutions approximately. --- **UNIT 5 ~ EXPONENTIAL FUNCTIONS** **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 properties of exponents to transform expressions for exponential functions. **F.IF #7:** Graph functions expressed symbolically and show key features of	**UNIT 7 ~ STATISTICS** **SP.ID #1:** Represent data with plots on the real number line (dot plots, histograms, and box plots). **SP.ID #2**: In the context of real-world applications by using the GAISE model, 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. **SP.ID #3:** In the context of real-world applications by using the GAISE model, interpret differences in shape, center, and spread in the context of the data sets, accounting for possible effects of extreme data points (outliers). **SP.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.	

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	the graph, by hand in simple cases and using technology for more complicated cases. **e.** Graph simple exponential functions, indicating intercepts and end behavior. **F.IF #8:** Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function. **b**. Use the properties of exponents to interpret expressions for exponential functions. **F.LE #1:** Distinguish between situations that can be modeled with linear functions and with exponential functions. **c.** Recognize situations in which a quantity grows or decays by a constant percent rate per unit interval relative to another. **F.LE #3:** Observe using graphs and tables that a quantity increasing exponentially eventually exceeds a quantity increasing linearly or quadratically. **F.LE #5:** Interpret the parameters in a	**SP.ID #6:** Represent data on two quantitative variables on a scatter plot, and describe how the variables are related. **c.** Fit a linear function for a scatter plot that suggests a linear association. **SP.ID #7:** Interpret the slope (rate of change) and the intercept (constant term) of a linear model in the context of the data. **SP.ID #8**: Compute (using technology) and interpret the correlation coefficient of a linear fit.	

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	linear or exponential function in terms of a context. **F.IF #9:** Compare properties of two functions each represented in a different way. b. Focus on linear, quadratic and exponential functions. **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 context.		

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Self-Paced, Independent Study

VOLUME

G #9: Know the formulas for the volumes of cones, cylinders, and spheres and use them to solve real-world and mathematical problems.

PYTHAGOREAN THEOREM

NS #2: Use rational approximations of irrational numbers to compare the size of irrational numbers, locate them approximately on a number line diagram, and estimate the value of expressions (e.g., π2).

EE #2: Use square root and cube root symbols to represent solutions to equations of the form x2 = p and x3 = p, where p is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes. Know that √2 is irrational.

G #6: Explain a proof of the Pythagorean Theorem and its converse.

G #7: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.

G #8: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

TRANSFORMATIONS

G #1: Verify experimentally the properties of rotations, reflections, and translations:
a. Lines are taken to lines, and line segments to line segments of the same length.
b. Angles are taken to angles of the same measure.
c. Parallel lines are taken to parallel lines.

G #2: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

G #3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

CONGRUENCE OF TRIANGLES

G #1: Verify experimentally the properties of rotations, reflections, and translations:
a. Lines are taken to lines, and line segments to line segments of the same length.

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b. Angles are taken to angles of the same measure.
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G #2: Understand that a two-dimensional figure is congruent to another if the second can be obtained from the first by a sequence of rotations, reflections, and translations; given two congruent figures, describe a sequence that exhibits the congruence between them.

G #3: Describe the effect of dilations, translations, rotations, and reflections on two-dimensional figures using coordinates.

SIMILARITY

G #4: Understand that a two-dimensional figure is similar to another if the second can be obtained from the first by a sequence of rotations, reflections, translations, and dilations; given two similar two-dimensional figures, describe a sequence that exhibits the similarity between them.

LINE & ANGLE RELATIONSHIPS

EE #6: Use similar triangles to explain why the slope m is the same between any two distinct points on a non-vertical line in the coordinate plane; derive the equation y = mx for a line through the origin and the equation y = mx + b for a line intercepting the vertical axis at b.

F #3: Interpret the equation y = mx + b as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.

G #1: Verify experimentally the properties of rotations, reflections, and translations:
a. Lines are taken to lines, and line segments to line segments of the same length.
b. Angles are taken to angles of the same measure.
c. Parallel lines are taken to parallel lines.

G #5: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

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