Student Baseline and Post-Instruction Checklist
Common Core Essential Elements and Instructional Achievement Level Descriptors
Mathematics Grade – High School

Student Name: _____ Student Grade: _____
Teacher: _____ Date: _____

Common Core State Standard: N-RN.1. Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for a notation for radicals in terms of rational exponents. *For example, we define $5^{1/3}$ to be the cube root of 5 because we want $(5^{1/3})^3 = 5^{(1/3)3}$ to hold, so $(5^{1/3})^3$ must equal 5.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-RN.1. Solve division problems with remainders using concrete objects.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Illustrate concept of remainders using objects and numerical representations.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Solve division problems with remainders using concrete objects.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify the difference between equal and not equal groups.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Recognize that a whole can be divided into parts.	**____Y _____N**

Common Core State Standard: N-RN.2. Rewrite expressions involving radicals and rational exponents using the properties of exponents.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-RN.2. N/A		**Indicate Yes or No**

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Common Core State Standard: N-RN.3. Explain why the sum or product of two rational numbers is rational; that the sum of a rational number and an irrational number is irrational; and that the product of a nonzero rational number and an irrational number is irrational.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-RN.3. N/A		**Indicate Yes or No**

Common Core State Standard: N-Q.1. Use units as a way to understand problems and to guide the solution of multi-step problems; choose and interpret units consistently in formulas; choose and interpret the scale and the origin in graphs and data displays.

N-Q.2. Define appropriate quantities for the purpose of descriptive modeling.

N-Q.3. Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-Q.1-3. Express quantities to the appropriate precision of measurement.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Express solutions to problems using the appropriate precision of measurements.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Express quantities to the appropriate precision of measurement.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Select the appropriate type of unit as a measurement tool.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Identify measurement tools. Identify the attribute to be measured (weight, length, and temperature).	**____Y _____N**

Common Core State Standard: N-CN.1. Know there is a complex number *i* such that $i^2 = -1$, and every complex number has the form $a + bi$ with a and b real.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-CN.1. N/A		**Indicate Yes or No**

Common Core State Standard: N-CN.2. Use the relation $i^2 = -1$ and the commutative, associative, and distributive properties to add, subtract, and multiply complex numbers.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-CN.2. Use the operations of addition, subtraction, and multiplication with decimals (decimal value x whole number) in real world situations using money as the standard units ($20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01).		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Apply the operations of addition, subtraction, and multiplication in real world situations using money as the standard units ($50, $20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01).	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Use the operations of addition, subtraction, and multiplication with decimals (decimal value x whole number) in real-world situations using money as the standard units ($20, $10, $5, $1, $0.25, $0.10, $0.05, and $0.01).	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Use the operations of addition, subtraction, and multiplication up to the tenths place with decimals.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Use the operations of addition, subtraction, multiplication, and multiplication with whole numbers less than 20.	**____Y _____N**

Common Core State Standard: N-CN.7. Solve quadratic equations with real coefficients that have complex solutions.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEN-CN.7. N/A		**Indicate Yes or No**

Common Core State Standard: A-SSE.1. Interpret expressions that represent a quantity in terms of its context.

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

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-SSE.1. Match an algebraic expression involving one operation to represent a given word expression with an illustration.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Write or match an algebraic expression for a given word expression involving more than one operation.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Match an algebraic expression involving one operation to represent a given word expression with an illustration.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify the operation used for word expressions as indicated by an illustration.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Recognize the symbol for an operation.	**____Y _____N**

Common Core State Standard: A-SSE.2. Use the structure of an expression to identify ways to rewrite it. *For example, see $x^4 - y^4$ as $(x^2)^2 - (y^2)^2$, thus recognizing it as a difference of squares that can be factored as $(x^2 - y^2)(x^2 + y^2)$.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-SSE.2. N/A		**Indicate Yes or No**

Common Core State Standard: 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.

c. Use the properties of exponents to transform expressions for exponential functions. *For example the expression 1.15^t can be rewritten as $(1.15^{1/12})^{12t} \approx 1.012^{12t}$ to reveal the approximate equivalent monthly interest rate if the annual rate is 15%.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-SSE.3. Solve simple one-step equations (multiplication and division) with a variable.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Solve one-step equations (multiplication and division of two digits) with a variable.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Solve simple one-step equations (multiplication and division) with a variable.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Solve basic equations.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Identify quantity and match to the number.	**____Y _____N**

Common Core State Standard: A-SSE.4. Derive the formula for the sum of a finite geometric series (when the common ratio is not 1), and use the formula to solve problems. *For example, calculate mortgage payments.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-SSE.4 Identify the missing part in any other equivalent ratio when given any ratio.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Find the missing components when given various ratios that form proportions.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Identify the missing part in any other equivalent ratio when given any ratio.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify the missing part in the next ratio using concrete objects when given a ratio (1:_).	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Identify or demonstrate a ratio relationship (See the recommendation for 6.RP.1 Level II).	**____Y _____N**

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-APR.1 N/A		**Indicate Yes or No**

Common Core State Standard: A-CED.1. Create equations and inequalities in one variable and use them to solve problems. *Include equations arising from linear and quadratic functions, and simple rational and exponential functions.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-CED.1. Solve an algebraic expression using subtraction.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at	

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
	a higher level of complexity then described in Level 3: • Solve an algebraic expression with more than one variable.	____Y _____N
Level III	Student demonstrates the content knowledge and skills: • Solve an algebraic expression using subtraction.	____Y _____N
Level II	Student demonstrates some of the content knowledge and skills: • Solve simple equations with unknown/missing values (without variables).	____Y _____N
Level I	Student attempts to perform the task with support: • Identify what is unknown.	____Y _____N

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

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

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.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-CED.2-4. Solve one-step inequalities.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Solve two-step inequalities with a variable.	____Y _____N
Level III	Student demonstrates the content knowledge and skills: • Solve one-step inequalities.	____Y _____N
Level II	Student demonstrates some of the content knowledge and skills: • Verify the solution to an inequality with one variable.	____Y _____N

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
Level I	Student attempts to perform the task with support: • Identify quantities that are greater than or less than a given quantity.	**____Y _____N**

Common Core State Standard: 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.

A-REI.2. Solve simple rational and radical equations in one variable, and give examples showing how extraneous solutions may arise.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-REI.1-2. N/A		**Indicate Yes or No**

Common Core State Standard: A-REI.3. Solve linear equations and inequalities in one variable, including equations with coefficients represented by letters.

A-REI.4. Solve quadratic equations in one variable.

- Use the method of completing the square to transform any quadratic equation in x into an equation of the form $(x – p)^2 = q$ that has the same solutions. Derive the quadratic formula from this form.
- Solve quadratic equations by inspection (e.g., for $x^2 = 49$), taking square roots, completing the square, the quadratic formula and factoring, as appropriate to the initial form of the equation. Recognize when the quadratic formula gives complex solutions and write them as $a \pm bi$ for real numbers a and b.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-REI.3-4. N/A (See EEA-ECED.1-2.)		**Indicate Yes or No**

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-REI.5. N/A		**Indicate Yes or No**

Common Core State 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.7. Solve a simple system consisting of a linear equation and a quadratic equation in two variables algebraically and graphically. For example, find the points of intersection between the line $y = –3x$ and the circle $x^2 + y^2 = 3$.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-REI.6-7. N/A (See EEA-REI.10-12.)		**Indicate Yes or No**

Common Core State Standard: 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.11. Explain why the x-coordinates of the points where the graphs of the equations $y = f(x)$ and $y = g(x)$ intersect are the solutions of the equation $f(x) = g(x)$; find the solutions approximately, e.g., using technology to graph the functions, make tables of values, or find successive approximations. Include cases where $f(x)$ and/or $g(x)$ are linear, polynomial, rational, absolute value, exponential, and logarithmic functions.

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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEA-REI.10.-12. Determine the two pieces of information that are plotted on a graph of an equation with two variables that form a line when plotted.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Make a prediction using the graph of an equation with two variables that form a line when plotted using the trend of the line.	**____Y _____N**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
Level III	Student demonstrates the content knowledge and skills: • Determine the two pieces of information that are plotted on a graph of an equation with two variables that form a line when plotted.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Use a graph of two variables to find the answer to a real-world problem.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify major parts of a graph.	**____Y _____N**

Common Core State 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 notations, 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. *For example, the Fibonacci sequence is defined recursively by f(0) = f(1) = 1, f(n+1) = f(n) + f(n-1) for n ≥ 1.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-IF.1-3. Use the concept of function to solve problems.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Use the concept of functions to identify how the two variables are affected.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Use the concept of function to solve problems.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Solve problems using a table that shows basic	**____Y _____N**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
	relationships (may not involve a true function).	
Level I	Student attempts to perform the task with support: • Identify basic information located on graphs.	**____Y _____N**

Common Core State Standard: F-IF.4. For a function that models a relationship between two quantities, interpret key features of graphs and tables in terms of the quantities, and sketch graphs showing key features given a verbal description of the relationship. *Key features include intercepts; intervals where the function is increasing, decreasing, positive, or negative; relative maximums and minimums; symmetries; end behavior; and periodicity*.

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.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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-IF.4-6. Interpret rate of change (e.g., higher/lower, faster/slower).		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Evaluate key features of a graph (e.g. increasing, decreasing, constant.).	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Interpret rate of change (e.g. higher/lower, faster/slower).	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Graph a simple linear equation represented by a table of values.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Read a table.	**____Y _____N**

Common Core State Standard: 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 exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-IF.7. N/A (See EEF-IF.1-3)		**Indicate Yes or No**

Common Core State Standard: F-IF.8. Write a function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-IF.8. N/A		**Indicate Yes or No**

Common Core State Standard: 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.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-IF.9. N/A		**Indicate Yes or No**

Common Core State Standard: F-BF.1. Write a function that describes a relationship between two quantities.

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

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-BF.1. Select the		**Indicate Yes or No**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
appropriate graphical representation (first quadrant) given a situation involving constant rate of change.		
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Complete the appropriate graphical representation (first quadrant) given a situation involving constant rate of change.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Select the appropriate graphical representation (first quadrant) given a situation involving constant rate of change.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Select the appropriate graphical representation (first quadrant) given a situation involving constant rate of change where the difference is very clear.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify the terms in a sequence.	**____Y _____N**

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-BF.2. Build an arithmetic sequence when provided a recursive rule with whole numbers.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Build an arithmetic sequence when provided a recursive rule with decreasing terms, decimals, or fractions.	**____Y _____N**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
Level III	Student demonstrates the content knowledge and skills: • Build an arithmetic sequence when provided a recursive rule with whole numbers.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify a term in a sequence.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Recognize a sequence.	**____Y _____N**

Common Core State Standard: F-BF.3. Identify the effect on the graph of replacing $f(x)$ by $f(x) + k$, $k\,f(x)$, $f(kx)$, and $f(x + k)$ for specific values of k (both positive and negative); find the value of k given the graphs. Experiment with cases and illustrate an explanation of the effects on the graph using technology. Include recognizing even and odd functions from their graphs and algebraic expressions for them.

F-BF.4. Find inverse functions. Solve an equation of the form f(x) = c for a simple function f that has an inverse and write an expression for the inverse. *For example, $f(x) = 2x^3$ or $f(x) = (x+1)/(x–1)$ for $x \neq 1$.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-BF.3-4. N/A		**Indicate Yes or No**

Common Core State Standard: F-LE.1. Distinguish between situations that can be modeled with linear functions and with exponential functions.

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

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-LE.4. For exponential models, express as a logarithm the solution to $ab^{ct} = d$ where a, c, and d are numbers and the base b is 2, 10, or e; evaluate the logarithm using.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-LE.1-3. Model a simple linear function such as y=mx to show functions grow by equal factors over equal intervals.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Plot points using pictures in first quadrant on a graph using whole numbers and explain how y increases/decreases as x changes.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Model a simple linear function such as y = mx to show functions grow by equal factors over equal intervals.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify a specific data point in the first quadrant and explain the meaning behind it.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Interpret major ideas of a graph with linear functions.	**____Y _____N**

Common Core State Standard: F-LE.5. Interpret the parameters in a linear or exponential function in terms of a context.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-LE.5. N/A		**Indicate Yes or No**

Common Core State Standard: F-TF.1. Understand radian measure of an angle as the length of the arc on the unit circle subtended by the angle.

F-TF.2. Explain how the unit circle in the coordinate plane enables the extension of trigonometric functions to all real numbers, interpreted as radian measures of angles traversed counterclockwise around the unit circle.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-TF.1-2. N/A		**Indicate Yes or No**

Common Core State Standard: F-TF.5. Choose trigonometric functions to model periodic phenomena with specified amplitude, frequency, and midline.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-TF.5. N/A		**Indicate Yes or No**

Common Core State Standard: F-TF.8. Prove the Pythagorean identity $\sin^2(\theta) + \cos^2(\theta) = 1$ and use it to find $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ given $\sin(\theta)$, $\cos(\theta)$, or $\tan(\theta)$ and the quadrant of the angle.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEF-TF.8. N/A		**Indicate Yes or No**

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.1. Know the attributes of perpendicular lines, parallel lines, and line segments, angles, and circles.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Compare attributes of perpendicular lines, parallel lines, line segments, angles, and circles.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Know the attributes of perpendicular lines, parallel lines, and line segments, angles, and circles.	**____Y _____N**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
Level II	Student demonstrates some of the content knowledge and skills: • Know the attributes of lines, circles, and angles with equivalent measure.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify a line and a shape (i.e. circle, square, triangle).	**____Y _____N**

Common Core State 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. Compare transformations that preserve distance and angle to those that do not (e.g., translation versus horizontal stretch).

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.2. N/A		**Indicate Yes or No**

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

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.3. N/A		**Indicate Yes or No**

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.4-5. Identify rotations, reflections, and		**Indicate Yes or No**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
slides.		

Common Core State Standard: 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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.6-8. Identify corresponding congruent (the same) parts of shapes.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Demonstrate why shapes are congruent.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Identify corresponding congruent (the same) parts of shapes.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Recognize congruent parts (angles and sides).	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Recognize shapes that are congruent.	**____Y _____N**

Common Core State Standard: 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.

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.

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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.9-11. N/A		**Indicate Yes or No**

Common Core State Standard: 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.*

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

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-CO.12-13. N/A		**Indicate Yes or No**

Common Core State Standard: G-SRT.1. Verify experimentally the properties of dilations given by a center and a scale factor:

- A dilation takes a line not passing through the center of the dilation to a parallel line, and leaves a line passing through the center unchanged.
- The dilation of a line segment is longer or shorter in the ratio given by the scale factor.

G-SRT.2. Given two figures, use the definition of similarity in terms of similarity transformations to decide if they are similar; explain using similarity transformations the meaning of similarity for triangles as the equality of all corresponding pairs of angles and the proportionality of all corresponding pairs of sides.

G-SRT.3. Use the properties of similarity transformations to establish the AA criterion for two triangles to be similar.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-SRT.1-3. N/A (See EEG-CO.6-8.)		**Indicate Yes or No**

Common Core State Standard: G-SRT.4. Prove theorems about triangles. *Theorems include: a line parallel to one side of a triangle divides the other two proportionally, and conversely; the Pythagorean Theorem proved using triangle similarity.*

G-SRT.5. Use congruence and similarity criteria for triangles to solve problems and to prove relationships in geometric figures.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-SRT.4-5. N/A		**Indicate Yes or No**

Common Core State Standard: G-SRT.6. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.

G-SRT.7. Explain and use the relationship between the sine and cosine of complementary angles.

G-SRT.8. Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-SRT.6-8. N/A		**Indicate Yes or No**

Common Core State Standard: G-C.1. Prove that all circles are similar.

G-C.2. Identify and describe relationships among inscribed angles, radii, and chords. *Include the relationship between central, inscribed, and circumscribed angles; inscribed angles on a diameter are right angles; the radius of a circle is perpendicular to the tangent where the radius intersects the circle.*

G-C.3. Construct the inscribed and circumscribed circles of a triangle, and prove properties of angles for a quadrilateral inscribed in a circle.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-C.1-3. N/A		**Indicate Yes or No**

Common Core State Standard: G-C.5. Derive using similarity the fact that the length of the arc intercepted by an angle is proportional to the radius, and define the radian measure of the angle as the constant of proportionality; derive the formula for the area of a sector.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-C.5. N/A		**Indicate Yes or No**

Common Core State Standard: G-GPE.1. Derive the equation of a circle of given center and radius using the Pythagorean Theorem; complete the square to find the center and radius of a circle given by an equation.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GPE.1. N/A		**Indicate Yes or No**

Common Core State Standard: G-GPE.2. Derive the equation of a parabola given a focus and directrix.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GPE.2-4. N/A		**Indicate Yes or No**

Common Core State Standard: 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; prove or disprove that the point (1, √3) lies on the circle centered at the origin and containing the point (0, 2).*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GPE.4. N/A (See EEG-GPE)		**Indicate Yes or No**

Common Core State 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).

G-GPE.6. Find the point on a directed line segment between two given points that partitions the segment in a given ratio.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GPE.5-6. N/A (See EEG.CO.1)		**Indicate Yes or No**

Common Core State Standard: G-GPE.7. Use coordinates to compute perimeters of polygons and areas of triangles and rectangles, e.g., using the distance formula.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GPE.7. Find perimeter and area of squares and rectangles to solve real-world problems.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Use formulas to find perimeter and area of squares and rectangles to solve real-world problems.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Find perimeter and area of squares and rectangles to solve real-world problems.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Find perimeter or area by counting on a grid.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify inside, around, and outside of a closed figure.	**____Y _____N**

Common Core State Standard: G-GMD.1. Give an informal argument for the formulas for the circumference of a circle, area of a circle, volume of a cylinder, pyramid, and cone. *Use dissection arguments, Cavalieri's principle, and informal limit arguments.*

G-GMD.3. Use volume formulas for cylinders, pyramids, cones, and spheres to solve problems.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GMD.1-3. Make a prediction based on knowledge of volume to identify volume of common containers (cups, pints, gallons, etc.).		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Apply knowledge of volume to make appropriate volumetric estimates.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Make a prediction based on knowledge of volume to identify volume of common containers (cups, pints, gallons, etc.).	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Which is more or less?	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Experience volume.	**____Y _____N**

Common Core State Standard: G-GMD.4. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-GMD.4. Distinguish between two-dimensional and three-dimensional objects to solve real-world problems.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Use the properties of two-dimensional and three-dimensional objects to solve real-world problems.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Distinguish between two-dimensional and three-dimensional objects to solve real-world problems.	**____Y _____N**

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
Level II	Student demonstrates some of the content knowledge and skills: • Distinguish between two-dimensional and three-dimensional.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify two-dimensional shapes.	**____Y _____N**

Common Core State Standard: G-MG.1. Use geometric shapes, their measures, and their properties to describe objects (e.g., modeling a tree trunk or a human torso as a cylinder).

G-MG.2. Apply concepts of density based on area and volume in modeling situations (e.g., persons per square mile, BTUs per cubic foot).

G-MG.3. Apply geometric methods to solve design problems (e.g., designing an object or structure to satisfy physical constraints or minimize cost; working with typographic grid systems based on ratios).

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EEG-MG.1-3. Use properties of geometric shapes to describe real-life objects.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Apply geometric methods to solve design problems.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Use properties of geometric shapes to describe real-life objects.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify geometric shapes.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Compare the capacity of three-dimensional objects.	**____Y _____N**

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

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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.1-2. Given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Collect and organize data in simple graphs and use findings to draw conclusions from the data.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Given data, construct a simple graph (table, line, pie, bar, or picture) and answer questions about the data.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Given a graph, answer simple questions.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify any part of a simple graph.	**____Y _____N**

Common Core State Standard: 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).

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.3. Indicate general trends on a graph or chart.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Extend a graph or chart to make a prediction.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Indicate general trends on a graph or chart.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills:	

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
	• Demonstrate increase and decrease over time.	____Y _____N
Level I	Student attempts to perform the task with support: • Determine categories needed on a graph.	____Y _____N

Common Core State Standard: S-ID.4. Use the mean and standard deviation of a data set to fit it to a normal distribution and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets, and tables to estimate areas under the normal curve.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.4. Calculate the mean of a given data set (limit data points to less than five).		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Calculate the mean of a given data set (more than five data points).	____Y _____N
Level III	Student demonstrates the content knowledge and skills: • Calculate the mean of a given data set (limit data points to less than five).	____Y _____N
Level II	Student demonstrates some of the content knowledge and skills: • Identify the average between two consecutive numbers.	____Y _____N
Level I	Student attempts to perform the task with support: • Identify the missing number between two data points.	____Y _____N

Common Core State 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.

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.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.5. N/A (See EEF-IF.1. and EEA-REI.6-7)		**Indicate Yes or No**

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

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.7. N/A (See EEF.IF.4-6)		**Indicate Yes or No**

Common Core State Standard: S-ID.8. Compute (using technology) and interpret the correlation coefficient of a linear fit.

S-ID.9. Distinguish between correlation and causation.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-ID.8-9. N/A		**Indicate Yes or No**

Common Core State Standard: S-IC.1. Understand statistics as a process for making inferences about population parameters based on a random sample from that population.

S-IC.2. Decide if a specified model is consistent with results from a given data-generating process, e.g., using simulation. *For example, a model says a spinning coin falls heads up with probability 0.5. Would a result of 5 tails in a row cause you to question the model?*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-IC.1-2. Determine the likelihood of an event occurring when the outcomes are equally likely to occur.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Determine the likelihood of an event occurring when the outcomes are not equally likely to occur.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Determine the likelihood of an event occurring when the outcomes are equally likely to occur.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Determine the possible outcomes of an event occurring.	**____Y _____N**
Level I	Student attempts to perform the task with support: • Identify one event or outcome of an event occurring.	**____Y _____N**

Common Core State Standard: S-IC.3. Recognize the purposes of and differences among sample surveys, experiments, and observational studies; explain how randomization relates to each.

S-IC.4. Use data from a sample survey to estimate a population mean or proportion; develop a margin of error through the use of simulation models for random sampling.

S-IC.5. Use data from a randomized experiment to compare two treatments; use simulations to decide if differences between parameters are significant.

S-IC.6. Evaluate reports based on data.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-IC.3-6. N/A (See EES-ID.1-2)		**Indicate Yes or No**

Common Core State Standard: S-CP.1. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events ("or," "and," "not").

S-CP.2. Understand that two events *A* and *B* are independent if the probability of *A* and *B* occurring together is the product of their probabilities, and use this characterization to determine if they are independent.

S-CP.3. Understand the conditional probability of *A* given *B* as *P*(*A* and *B*)/*P*(*B*), and interpret independence of *A* and *B* as saying that the conditional probability of *A* given *B* is the same as the probability of *A*, and the conditional probability of *B* given *A* is the same as the probability of *B*.

S-CP.4. Construct and interpret two-way frequency tables of data when two categories are associated with each object being classified. Use the two-way table as a sample space to decide if events are independent and to approximate conditional probabilities. *For example, collect data from a random sample of students in your school on their favorite subject among math, science, and English. Estimate the probability that a randomly selected student from your school will favor science given that the student is in tenth grade. Do the same for other subjects and compare the results.*

S-CP.5. Recognize and explain the concepts of conditional probability and independence in everyday language and everyday situations. *For example, compare the chance of having lung cancer if you are a smoker with the chance of being a smoker if you have lung cancer.*

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-CP.1-4. Identify when events are independent or dependent.		**Indicate Yes or No**
Level IV	Student demonstrates the content knowledge and skills at a higher level of complexity then described in Level 3: • Find the probability of an event after another event has occurred.	**____Y _____N**
Level III	Student demonstrates the content knowledge and skills: • Identify when events are independent or dependent.	**____Y _____N**
Level II	Student demonstrates some of the content knowledge and skills: • Identify the outcomes of an event.	**____Y _____N**
Level I	Student attempts to perform the task <u>with support:</u> • Determine which event occurs first in a sequence.	**____Y _____N**

Common Core State Standard: S-CP.6. Find the conditional probability of *A* given *B* as the fraction of *B*'s outcomes that also belong to *A*, and interpret the answer in terms of the model.

S-CP.7. Apply the Addition Rule, P(A or B) = P(A) + P(B) – P(A and B), and interpret the answer in terms of the model.

Common Core Essential Elements - Math	Instructional Achievement Level Descriptors	Estimated Level of Student Proficiency
EES-CP.6-7. N/A (See EES-IC.1-2)		**Indicate Yes or No**