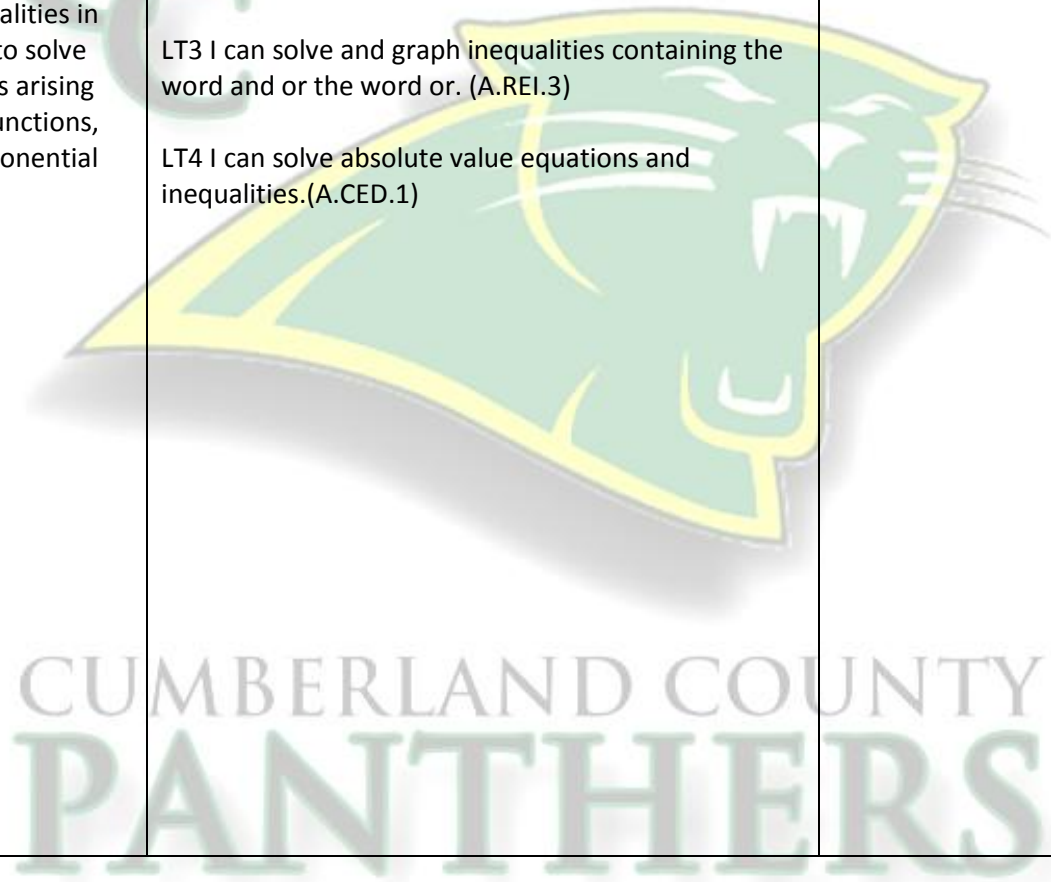


**CUMBERLAND COUNTY SCHOOL DISTRICT  
BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

School: Cumberland County High School	Mathematics	9
<b>Benchmark Assessment 1</b>		
Instructional Timeline: 12 Instructional Units that correspond to Learning Check schedule – Generally – Term 1 Units 1, 2, and 3 – Benchmark 1 Term 2 Units 4, 5, and 6 – Benchmark 2 Term 3 Units 7, 8, and 9 – Benchmark 3 Term 4 Units 10, 11, and 12 – Benchmark 4		
Topic(s): Algebra I		
Kentucky Core Academic Standards	Learning Targets (I Can Statements)	Key Vocabulary
<b><u>Unit 1 Foundations of Algebra</u></b>  <u>N.RN.3</u> Explain why sums and products of rational numbers are rational, that the sum of a rational and irrational number is irrational, and that the product of a nonzero rational number and an irrational number is irrational. <u>A.SSE.1</u> Interpret expressions that represent a quantity in terms of its context. ★ a. Interpret parts of an expression, such as terms, factors, and coefficients <u>A.CED.1</u> 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.	<b><u>Unit 1 Foundations of Algebra</u></b>  LT1 I can write and simplify algebraic expressions including expressions involving exponents (A.SSE.1.a)  LT2 I can use the order of operations to evaluate expressions. (A.SSE.1.a)  LT3 I can classify, group and compare real numbers (N.RN.3)  LT 4 I can find and estimate square roots. (N.RN.3)  LT5 I can identify and use properties of real numbers. (N.RN.3)  LT6 I can perform operations on real numbers(N.RN.3)	<b><u>Unit 1 Foundations of Algebra</u></b>  Exponents Powers Simplify Algebraic Expressions Order of Operations Real Numbers Square Roots Radical Radicand Solve Equation

Unit 2 Solving Equations	Unit 2 Solving Equations	Unit 2 Solving Equations
<p><u>A.CED.1</u> 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.</p> <p><u>A.REI.3</u> Solve Linear equations in one variable including equations with coefficients represented by letters.</p> <p><u>A.CED.4</u> Rearrange formulas to highlight a quantity of interest, using the same reasoning as in solving equations. For example, rearrange Ohm’s law <math>V = IR</math> to highlight resistance R</p> <p><u>N.Q.1</u> 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 graph and data displays.</p> <p><u>N.Q.3</u> Choose a level of accuracy appropriate to limitations on measurement when reporting quantities.</p>	<p>LT1 I can solve equations in one variable. (A.CED.1) (A.REI.3) (A.CED.1) (A.CED.1)</p> <p>LT2 I can identify equations that are identities or have no solution. (A.CED.1)</p> <p>LT3 I can rewrite and use literal equations(A.CED.4)</p> <p>LT4 I can determine ratios and rates.(N.Q.1)</p> <p>LT5 I can I can convert units and rates.(N.Q.2)_</p> <p>LT6 I can solve and apply proportions. (A.REI.3))</p> <p>LT7 I can solve percent problems using proportions and the percent equation. (N.Q.3)</p>	<p>Variable Step Equation Multi-step Identity No-Solution Literal Equations Ratio Proportion Percent Equation</p>

Unit 3 – Solving Inequalities	Unit 3 – Solving Inequalities	Unit 3 – Solving Inequalities
<p><u>A.REI.3</u> Solve Linear equations in one variable including equations with coefficients represented by letters.</p> <p><u>A.CED.1</u> 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.</p>	<p>LT1 I can write, graph, and identify solutions of inequalities.(A.REI.3)</p> <p>LT2 I can solve one variable and multi-step inequalities.(A.REI.3)</p> <p>LT3 I can solve and graph inequalities containing the word and or the word or. (A.REI.3)</p> <p>LT4 I can solve absolute value equations and inequalities.(A.CED.1)</p>	<p>Graph Linear Inequality absolute value</p>



**CUMBERLAND COUNTY SCHOOL DISTRICT  
BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

School: Cumberland County High School	Subject: Mathematic	Grade: 9
<b>Benchmark Assessment 2</b>		
Instructional Timeline: 12 Instructional Units that correspond to Learning Check schedule – Generally – Term 1 Units 1, 2, and 3 – Benchmark 1 Term 2 Units 4, 5, and 6 – Benchmark 2 Term 3 Units 7, 8, and 9 – Benchmark 3 Term 4 Units 10, 11, and 12 – Benchmark 4		
Topic(s): Algebra I		
<b>Kentucky Core Academic Standards</b>	<b>Learning Targets (I Can Statements)</b>	<b>Key Vocabulary</b>
<b>Unit 4 Introduction to Functions</b>  <u>F.IF.4</u> 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 <u>A.REI.10</u> Understand 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). <u>F.IF.5</u> Relate the domain of a function to its graph and, where applicable, to the quantitative relationship it describes.	<b>Unit 4 Introduction to Functions</b>  LT1 I can represent mathematical relationships using graphs.(F.IF.4)  LT2 I can identify and represent patterns that describe linear and non-linear functions.(A.REI.10)  LT4 I can write and graph equations that represent functions.(F.IF.5)  LT6 I can determine whether a relation is a function.(F.IF.1)  LT7 I can determine the domain and range and use function notation, (F.IF.2)	<b>Unit 4 Introduction to Functions</b>  Relations Graphs Functions Linear Functions Non-Linear Functions Domain Range Function Notation

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.★

N.Q.2

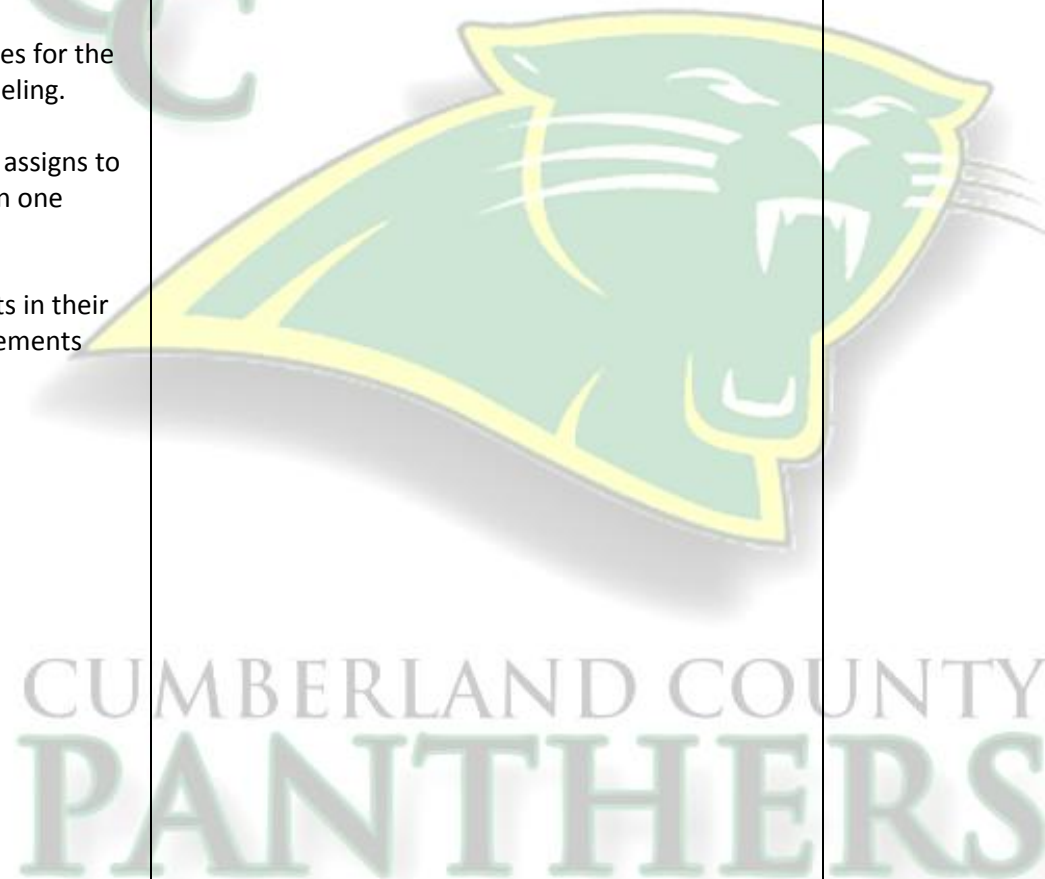
Define appropriate quantities for the purpose of descriptive modeling.

F.IF.1

Understand that a function assigns to each element of the domain one element of the range

F.IF.2

Evaluate functions for inputs in their domains and interpret statements



<p><b>Unit 5 – Linear Functions</b></p> <p><u>F.IF.6</u> 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.★</p> <p><u>F.LE.1</u> Distinguish between situations that can be modeled with linear functions and with exponential functions, b. Recognize situations in which one quantity changes at a constant rate per unit interval relative to another. A.CED.2 Create equations in two or more variables to represent relationships between quantities; graph equations on coordinate axes with labels and scales.</p> <p><u>F.IF.7</u> 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.</p> <p><u>F.LE.2</u></p>	<p><b>Unit 5 – Linear Functions</b></p> <p>LT1 I can find rates of change from tables.(F.IF.6)</p> <p>LT2 I can the slope of a line. (F.LE.1.b)</p> <p>LT3 I can write and graph linear equations using slope intercept form, point slope form, and standard form. (F.IF.7.a).(also A.SSE.1.a, A.SSE.2, A.CED.2, F.IF.4, F.BF.1.a, F.BF.3, F.LE.2, F.LE.5)</p> <p>LT4 I can graph linear equations. (A.CED.2)</p> <p>LT5 I can determine whether lines are parallel, perpendicular, or neither. (G.GPE.5)</p> <p>LT6 I can write equations of lines that are parallel or perpendicular to a given line. (g.GPE.5)</p> <p>LT7 I can graph an absolute value function.(F.BF.3)</p> <p>LT8 I can translate the graph of an absolute value function.(F.IF.7.b)</p>	<p><b>Unit 5 – Linear Functions</b></p> <p>Tables Rate of Change Slope Slope Formula Slope-Intercept Form of an Equation Point-Slope Form of an Equation X-Intercept Y-Intercept Standard Form of an Equation Parallel Perpendicular Absolute Value Function Translation of a Graph</p>
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Construct linear and exponential functions, including arithmetic and geometric sequences, given a graph, a description of a relationship, or two input-output pairs.

G.GPE.5

Prove the slope criteria for parallel and perpendicular lines and uses 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)

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.



<p><b>Unit 6 – Systems of Equations and Inequalities</b></p> <p><u>A.REI.6</u> Solve systems of linear equations exactly and approximately, focusing on pairs of linear equations in two variables</p> <p><u>A.REI.5</u> Prove, 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.</p> <p><u>A.REI.12</u> Graph the solution of a linear inequality in two variables as a half plane and graph the solution set of a system of linear inequalities in two variables as the intersection of the corresponding half planes.</p> <p><u>A.CED.3</u> 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</p>	<p><b>Unit 6 – Systems of Equations and Inequalities</b></p> <p>LT1 I can solve systems of equations by graphing. (A.REI.5) (A.REI.6)</p> <p>LT2 I can graph linear inequalities in two variables. (A.REI.12)</p> <p>LT3 I can use linear inequalities to model real life situations. (A.CED.3)</p> <p>LT4 I can solve systems of linear inequalities by graphing. (A.REI.12)</p> <p>LT5 I can model real world situations using systems of linear inequalities. (A.REI.12)</p>	<p><b>Unit 6 – Systems of Equations and Inequalities</b></p> <p>System of Linear Equations Point of Intersection Substitution Method Elimination Method System of Linear Inequalities</p>
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**CUMBERLAND COUNTY SCHOOL DISTRICT  
BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

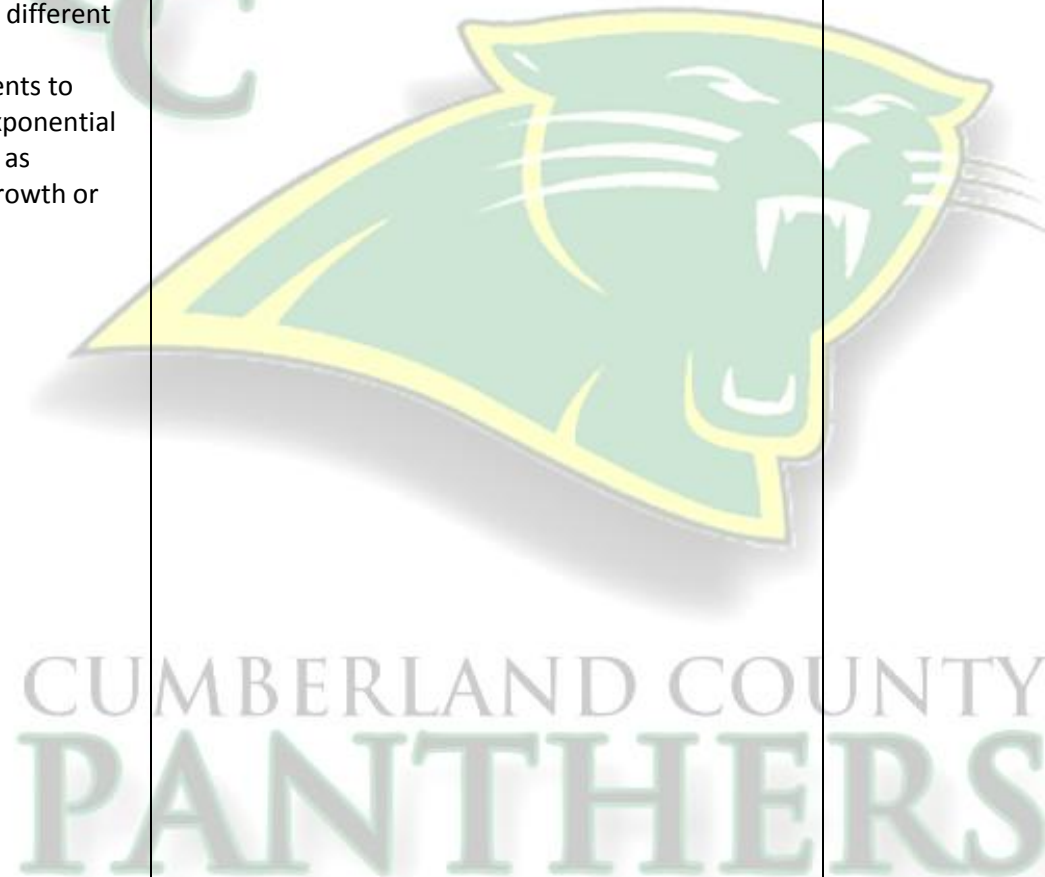
School: Cumberland County High School	Subject: Mathematics	Grade: 9
<b>Benchmark Assessment 3</b>		
Instructional Timeline: 12 Instructional Units that correspond to Learning Check schedule – Generally		
Term 1 Units 1, 2, and 3 - Benchmark 1		
Term 2 Units 4, 6, and 6 - Benchmark 2		
Term 3 Units 7, 8, and 9 - Benchmark 3		
Term 4 Units 10, 11, and 12 - Benchmark 4		
Topic(s): Algebra I		
<b>Kentucky Core Academic Standards</b>	<b>Learning Targets (I Can Statements)</b>	<b>Key Vocabulary</b>
<p><b>Unit 7 – Exponents and Exponential Functions</b></p> <p><u>N.RN.1</u> Explain how the definition of the meaning of rational exponents follows from extending the properties of integer exponents to those values, allowing for the notation of radicals in terms of rational exponents.</p> <p><u>F.IF.7</u> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases e. Graph exponential and logarithmic functions, showing intercepts and end behavior, and trigonometric functions, showing period, midline, and amplitude.</p> <p><u>N.RN.2</u></p>	<p><b>Unit 7 – Exponents and Exponential Functions</b></p> <p>LT 1 I can simplify expressions using properties of exponents(N.RN.1)</p> <p>LT2 I can rewrite expressions involving radicals and rational exponents. .(N.RN.2)</p> <p>LT3 I can evaluate and graph exponential functions. (F.IF.7.e)</p> <p>LT4 I can model exponential growth and decay. (F.IF.8.b)</p>	<p><b>Unit 7 – Exponents and Exponential Functions</b></p> <p>Exponents Base Negative Exponent Powers Power to a Power Quotient Radical Rational Exponent Exponential Functions Exponential Growth Exponential Decay</p>

Rewrite expressions involving radicals and rational exponents using properties of exponents.

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 properties of exponents to interpret expressions for exponential functions and classify them as representing exponential growth or decay.



Unit 8 – Polynomials and Factoring	Unit 8 – Polynomials and Factoring	Unit 8 – Polynomials and Factoring
<p><u>A.APR.1</u> 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</p> <p><u>A.SSE.1</u> Interpret expressions that represent a quantity in terms of its context. ★ a. Interpret parts of an expression, such as terms, factors, and coefficients. b. Interpret complicated expressions by viewing one or more of their parts as a single entity. For example, interpret <math>P(1+r)^n</math> as the product of <math>P</math> and a factor not depending on <math>P</math>.</p>	<p>LT1 I can classify, add, and subtract polynomials.(A.APR.1)</p> <p>LT2 I can multiply a monomial by a polynomial. (a.APR.1)</p> <p>LT3 I can factor a monomial (GCF) from a polynomial. (A.APR.1)</p> <p>LT4 I can multiply two binomials and a binomial by a trinomial. (A.APR.1)</p> <p>LT5 I can factor trinomials. (A.SSE.1.a)</p> <p>LT6 I can factor perfect square trinomials and the differences of two squares.(A.SSE.1.a)</p>	<p>Monomial Binomial Trinomial Polynomial FOIL Method Factor Perfect Square Trinomial Difference of Two Squares</p>



<p><b>Unit 9 – Quadratic Functions and Equations</b></p> <p><u>F.IF.7</u> Graph functions expressed symbolically and show key features of the graph, by hand in simple cases and using technology for more complicated cases</p> <p>a. Graph linear and quadratic functions and show intercepts, maxima, and minima</p> <p><u>F.IF.4</u> 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</p> <p><u>A.REI.4</u> Solve quadratic equations in one variable</p> <p>a. Use the method of completing the square to transform any quadratic in <math>x</math> into an equation in <math>(x-p)^2</math> form</p> <p>b. Solve quadratic equations by inspection taking square roots, completing the square, the quadratic formula, and factoring.</p> <p><u>F.LE.1.a</u> Distinguish between situations that can be modeled with linear functions and with exponential functions.</p> <p>a. Prove linear functions grow by</p>	<p><b>Unit 9 – Quadratic Functions and Equations</b></p> <p>LT1 I can solve and graph quadratic functions (factoring, completing the square, and Quadratic Formula) (F.IF.7.a) (A.REI.4.a and b) (F.IF.4)</p> <p>LT2 I can determine the number and types of solutions of a quadratic equation. (A.REI.4.a)</p> <p>LT3 I can solve systems of linear and quadratic equations. (A.REI.7)</p>	<p><b>Unit 9 – Quadratic Functions and Equations</b></p> <p>Parabola Quadratic Function Quadratic Equation Completing the Square Quadratic Formula System of Linear Equations Systems of Quadratic Equations</p>
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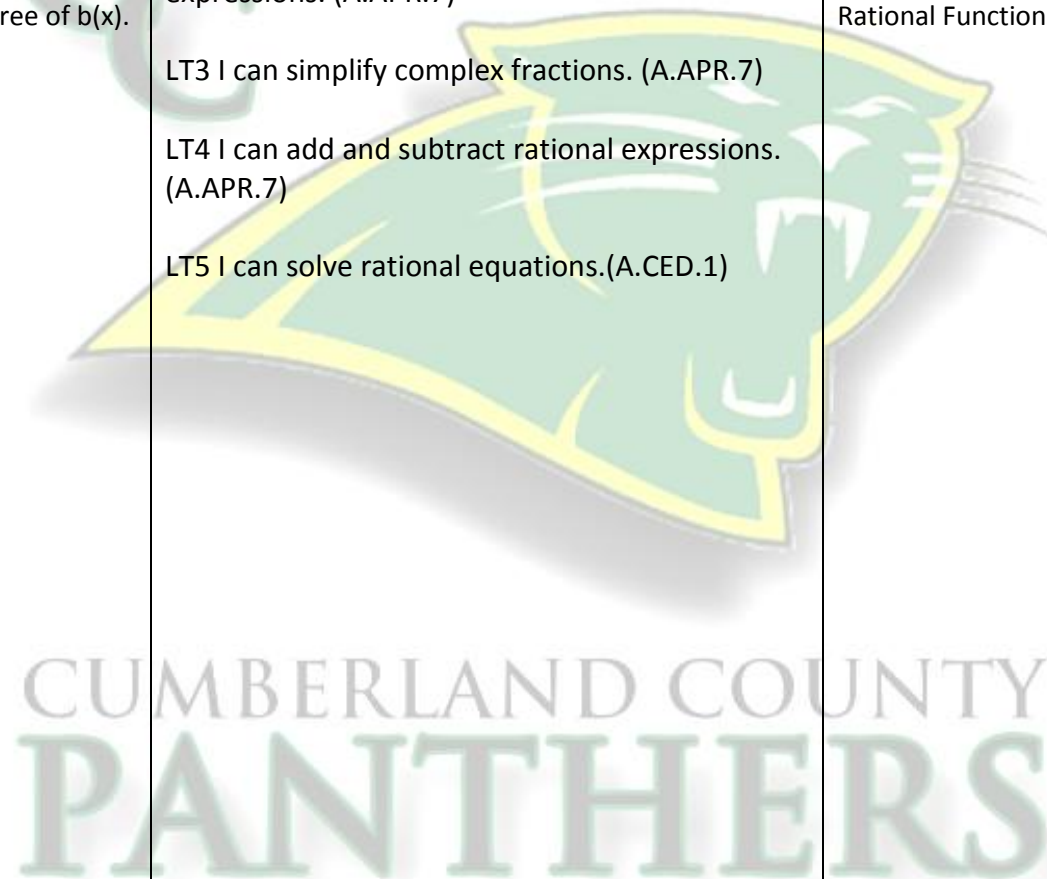
equal differences over equal intervals,  
and that exponential functions grow  
by equal factors over equal intervals.



**CUMBERLAND COUNTY SCHOOL DISTRICT  
BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

School: Cumberland County High School	Subject: Mathematics	Grade: 9
<b>Benchmark Assessment 4</b>		
Instructional Timeline: : 12 Instructional Units that correspond to Learning Check schedule – Generally Term 1 Units 1, 2, and 3 - Benchmark 1 Term 2 Units 4, 6, and 6 - Benchmark 2 Term 3 Units 7, 8, and 9 - Benchmark 3 Term 4 Units 10, 11, and 12 - Benchmark 4		
Topic(s): Algebra I		
Kentucky Core Academic Standards	Learning Targets (I Can Statements)	Key Vocabulary
<b>Unit 10 – Radical Expressions and Equations</b> <u>G.SRT.8</u> Use trigonometric ratios and the Pythagorean Theorem to solve right triangles in applied problems. <u>F.IF.7</u> 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 square root, cube root, and piecewise defined functions including step functions and absolute value functions. <u>A.REI.2</u> Solve simple rational and radical equations in one variable, and give examples how extraneous solutions may exist.	<b>Unit 10 – Radical Expressions and Equations</b> LT1 I can solve problems using the Pythagorean theorem. (G.SRT.8) LT2 I can simplify radical involving products and quotients. (A.REI.2) LT3 I can simplify sums and differences of radical expressions. (A.REI.2) LT4 I can simplify products and quotients of radical expressions. (A.REI.2) LT5 I can solve equations containing radicals and identify any extraneous solutions. (A.REI.2)	<b>Unit 10 – Radical Expressions and Equations</b> Pythagorean Theorem Right Triangles Radical Expression Radical Equations Extraneous Solutions Square Root Functions

Unit 11 – Rational Expressions and Functions	Unit 11 – Rational Expressions and Functions	Unit 11 – Rational Expressions and Functions
<p><u>A.APR.6</u>            Rewrite simple rational expressions in different forms: write <math>a(x)/b(x)</math> in the form <math>q(x)+r(x)/b(x)</math>, <math>a(x)</math>, <math>b(x)</math>, <math>q(x)</math>, and <math>r(x)</math> are polynomials with the degree of <math>r(x)</math> less than the degree of <math>b(x)</math>.</p>	<p>LT1 I can simplify rational expressions. (A.APR.7)</p> <p>LT2 I can multiply and divide rational expressions. (A.APR.7)</p> <p>LT3 I can simplify complex fractions. (A.APR.7)</p> <p>LT4 I can add and subtract rational expressions. (A.APR.7)</p> <p>LT5 I can solve rational equations.(A.CED.1)</p>	<p>Rational Expressions            Complex Fractions            Rational Equations            Proportions            Rational Functions</p>



<p><b>Unit 12 – Data Analysis and Probability</b></p> <p><u>N.VM.6</u> Use matrices to represent and manipulate data.</p> <p><u>S.CP.9</u> Use permutations and combinations to compute probabilities of compound events and solve problems.</p> <p><u>S.CF.1</u> Describe events in subsets of a sample space using characteristics of the outcomes or as complements of other events. <u>S.CP.7</u> Apply the addition rule <math>P(A \text{ or } B) = P(A) + P(B) - P(A \text{ and } B)</math> and interpret the answer in terms of the model.</p>	<p><b>Unit 12 – Data Analysis and Probability</b></p> <p>LT1 I can organize data in matrix format. (N.VM.6)</p> <p>LT 2 I can add and subtract matrices and multiply a matrix by a scalar. (N.VM.6)</p> <p>LT3 I can find permutations and combinations. ( S.CP.9)</p> <p>LT4 I can find theoretical and experimental probabilities. (S.CF.1)</p> <p>LT5 I can find probabilities of mutually exclusive and overlapping events.(S.CP.7)</p> <p>LT6 I can find probabilities of independent and dependent events. (S.CP.7)</p>	<p><b>Unit 12 – Data Analysis and Probability</b></p> <p>Matrix Scalar Permutations Combinations Theoretical Probability Experimental Probability Mutually Exclusive Events Overlapping Events Independent Events Dependent Events</p>
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