

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

School: CCHS	Subject: Precalculus	Grade: 12
<b>Benchmark Assessment 1</b>		
Instructional Timeline: Units 1, 2, 3 Term 1 <u><b>Dependent upon Learning check schedule</b></u>		
Topic(s): Functions, Systems of Linear equations and inequalities, Word Problems		
Kentucky Core Academic Standards	Learning Targets (I Can Statements)	Key Vocabulary
<u><b>Unit 1 Linear Functions</b></u>  A.1.a Solve single-step and multistep equations and inequalities in one variable  A.1.f Write linear equations in standard form and slope-intercept form when given two points, a point and the slope, or the graph of the Equation  A.1.g Graph a linear equation using a table of values, $x$ - and $y$ -intercepts, or slope-intercept form  C.1.d Perform operations on functions, including function composition, and determine domain and range for each of the given functions	<u><b>Unit 1 Linear Functions</b></u> <u><b>I CAN:</b></u> 1. Determine if a given relation is a function and perform operations with functions (C.1.d) 2. Evaluate and find zeros of linear functions using functional notation (A.1.a) 3. Graph and write functions and inequalities (A.1.f , A.1.g) 4. Write equations of parallel and perpendicular lines (A.1.f) 5. Model data using scatter plots and write prediction equations (A.1.f)	Relation, Domain, Range, Function Vertical line test, Function Notation Composition of functions, Linear equation x-intercept, y-intercept slope, slope intercept form standard form, point slope form zeros, constant function parallel line, perpendicular lines coincide, line of best fit prediction equation, scatter plots correlation coefficient, regression line

<p><b>Unit 2 Systems of linear equations and inequalities</b></p> <p>D.2.a Graph a system of linear inequalities in two variables with and without technology to find the solution set to the system</p> <p>D.2.b Solve linear programming problems by finding maximum and minimum values of a function over a region defined by linear inequalities</p> <p>D.1.c Solve algebraically a system containing three variables</p> <p>I.1.a Add, subtract, and multiply matrices</p> <p>I.1.b Use addition, subtraction, and multiplication of matrices to solve real-world problems</p> <p>I.1.c Calculate the determinant of <math>2 \times 2</math> and <math>3 \times 3</math> matrices</p> <p>I.1.d Find the inverse of a <math>2 \times 2</math> matrix</p> <p>i.1.f Use technology to perform operations on matrices, find determinants, and find inverses</p>	<p><b>Unit 2 Systems of linear equations and inequalities</b></p> <p><u>I CAN:</u></p> <ol style="list-style-type: none"> <li>1. Solve systems of equations and inequalities (D.1.a, D.2.c)</li> <li>2. Define matrices (I.1.a)</li> <li>3. Add, subtract, and multiply matrices (I.1.b)</li> <li>4. Find determinants and inverses of matrices (I.1.c, I.1.d, I.1.f)</li> <li>5. Use Linear programming to solve problems. (D.2.b)</li> </ol>	<p>System of equations, solution, consistent, Inconsistent, independent, Dependent. Elimination method, substitution method, ordered triplet, Matrix, elements, dimensions, row matrix, column matrix, square matrix, identity matrix, scalar, determinant, inverse matrix, system of linear inequalities, Vertex theorem, linear programming, constraints, infeasible, unbounded,</p>
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<p><b>Unit 3 Word Problems</b></p> <p><u>ASSE.3</u> Choose and produce an equivalent form of an expression to reveal and explain properties of the quantity represented by the expression</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><b>Unit 3 Word Problems</b></p> <p><b><u>I CAN:</u></b></p> <ol style="list-style-type: none"> <li>1. Solve age problems (ASSE .3, ACED.1)</li> <li>2. Solve Distance, rate, time word problems (ASSE .3, ACED.1)</li> <li>3. Solve mixture problems (ASSE .3, ACED.1)</li> <li>4. Solve work problems (ASSE .3, ACED.1)</li> <li>5. Consecutive integer word problems (ASSE .3, ACED.1)</li> <li>6. Solve percent problems (ASSE .3, ACED.1)</li> </ol>	<p>Consecutive integer, distance, rate, time, ratio</p>
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BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

School: CCHS

Subject: Precalculus

Grade: 12

***Benchmark Assessment 2***

Instructional Timeline:  
Units 4a, 4b, 5 Term 2

**Dependent upon Learning check schedule**

Topic(s): Polynomial and rational expressions, trigonometry

Kentucky Core Academic Standards

Learning Targets (I Can Statements)

Key Vocabulary

**UNIT 4a. Polynomial and Rational Expressions**

E.1.a Solve quadratic equations and inequalities using various techniques, including completing the square and using the quadratic Formula

F.2.a Determine the number and type of rational zeros for a polynomial function

F.2.b Find all rational zeros of a polynomial function

G.1.a Solve mathematical and real-world rational equation problems (e.g., work or rate problems)

G.1.g Evaluate and solve radical equations given a formula for a real-world situation

**UNIT 4a. Polynomial and Rational Expressions**

**I CAN:**

1. Determine roots of polynomial equations (f.2.a, f.2.b)

2. Solve quadratic, rational, and radical equations and rational and radical inequalities (E.1.a, G.1.a, G.1.g)

Polynomial, degree, leading coefficient, zeros, root, imaginary number, complex numbers, fundamental theorem of algebra, completing the square, quadratic formula, discriminant, conjugate, remainder theorem, synthetic division, factor theorem, rational root theorem, integral root theorem, Descartes' rule of signs, Location principle, lower bound, upper bound, rational equation, rational inequality, radical equations, extraneous solutions, radical inequalities,



<p><b><u>Unit 4b</u> Polynomial and rational functions</b></p> <p>F.1.b Factor polynomials using a variety of methods (e.g., factor theorem, synthetic division, long division, sums and differences of cubes, grouping)</p> <p>F.2.c Recognize the connection among zeros of a polynomial function, x-intercepts, factors of polynomials, and solutions of polynomial Equations</p> <p>F.2.d Use technology to graph a polynomial function and approximate the zeros, minimum, and maximum; determine domain and range of the polynomial function</p>	<p><b><u>Unit 4b</u> Polynomial and rational functions</b></p> <p><b><u>I CAN:</u></b></p> <ol style="list-style-type: none"> <li>1. Find the factors of polynomials (F.1.b)</li> <li>2. Approximate the real zeros of polynomial functions (F.2.d)</li> <li>3. Write and interpret polynomial functions that model real world data</li> </ol>	<p>Polynomial, degree, leading coefficient, zeros, root, imaginary number, complex numbers, fundamental theorem of algebra, completing the square, quadratic formula, discriminant, conjugate, remainder theorem, synthetic division, factor theorem, rational root theorem, integral root theorem, Descartes' rule of signs, Location principle, lower bound, upper bound, rational equation, rational inequality, radical equations, extraneous solutions, radical inequalities,</p>
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<p><b><u>Unit 5 Trigonometry</u></b></p> <p>G.3.a Use the law of cosines and the law of sines to find the lengths of sides and measures of angles of triangles in mathematical and real-world problems</p> <p>G.3.b Use the unit-circle definition of the trigonometric functions and trigonometric relationships to find trigonometric values for general Angles</p> <p>G.3.C Measure angles in standard position using degree or radian measure and convert a measure from one unit to the other</p>	<p><b><u>Unit 5 Trigonometry</u></b></p> <p><b><u>I CAN:</u></b></p> <ol style="list-style-type: none"> <li>1. Convert degree measures to degrees, minutes and seconds and vice versa. (G.3.c)</li> <li>2. Identify angles that are coterminal with a given angle (G.3.c)</li> <li>3. Find the value of trigonometric functions (G.3.b)</li> <li>4. Solve triangles (G.3.a)</li> <li>5. Find the area of triangles (G.3.a)</li> </ol>	<p>Vertex, initial side, terminal side, standard position, degrees, minutes, seconds, coterminal angles, reference angle, Hypotenuse, side opposite, side adjacent, trigonometric ratios, sine, cosine, tangent, cosecant, secant, cotangent, co-function Unit circle, circular functions, trigonometric functions, angle of elevation, angle of depression, trigonometric inverses, arcsine, arccosine, arctangent, Law of sines, law of cosines,</p>
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**CUMBERLAND COUNTY SCHOOL DISTRICT  
BENCHMARK ASSESSMENT CURRICULUM PACING GUIDE**

School: CCHS	Subject: Precalculus	Grade: 12
<b>Benchmark Assessment 3</b>		
Instructional Timeline: Units 6, 7,8 Term 3 <b><u>Dependent upon Learning check schedule</u></b>		
Topic(s): Trigonometric identities and equations, exponential and Logarithmic functions, sequences and series		
<b>Kentucky Core Academic Standards</b>	<b>Learning Targets (I Can Statements)</b>	<b>Key Vocabulary</b>
<b><u>Unit 6 Trigonometric identities and Equations</u></b>  G.3.g Use sine, cosine, and tangent functions, including their domains and ranges, periodic nature, and graphs, to interpret and analyze Relations	<b><u>Unit 6 Trigonometric identities and Equations</u></b>  1. Use reciprocal, quotient, Pythagorean, symmetry, and opposite angle identities (G.3.g) 2. Verify trigonometric identities(G.3.g) 3. Use sum difference, double angle and half angle identities (G.3.g) 4. Solve trigonometric equations and inequalities (G.3.g) 5. Determine the distance from a point to a line (G.3.g)	Identity, trigonometric identity, reciprocal identities, quotient identity, Pythagorean identities, symmetry identities, opposite angle identities, sum and difference identities, double angle identities, half angle identities,



<p><b>Unit 7 Exponential and Logarithmic Functions</b></p> <p>G.1.f Evaluate expressions and solve equations containing <math>n</math>th roots or rational exponents</p> <p>G.2.a Graph exponential and logarithmic functions with and without technology</p>	<p><b>Unit 7 Exponential and Logarithmic Functions</b></p> <p><u><b>I CAN:</b></u></p> <ol style="list-style-type: none"> <li>1. Simplify and evaluate expressions containing rational and irrational exponents (G.1.f)</li> <li>2. Use and graph exponential functions and inequalities (G.2.a)</li> <li>3. Evaluate expressions and graph and solve equations involving logarithms (G.2.a)</li> <li>4. Model real-world situations and solve problems using common and natural logarithms (G.2.a)</li> </ol>	<p>Anti In x  Antilogarithm  Common logarithm  Doubling time,  Exponential function  Exponential growth  Ln x  Logarithm  Logarithmic function  Natural logarithm  Power function  Scientific notation</p>
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<p><b>Unit 8 Sequences and Series</b></p> <p>H.2.a Find the <math>n</math>th term of an arithmetic or geometric sequence</p> <p>H.2.b Find the position of a given term of an arithmetic or geometric sequence</p> <p>H.2.c Find sums of a finite arithmetic or geometric series</p> <p>H.2.d Use sequences and series to solve real-world problems</p> <p>H.2.e Use sigma notation to express sums</p>	<p><b>Unit 8 Sequences and Series</b></p> <ol style="list-style-type: none"> <li>1. Identify and find the <math>n</math>th terms of arithmetic, geometric, and infinite sequences (H.2.a, H.2.b)</li> <li>2. Determine the sums of arithmetic, geometric, and infinite series (H.2.c)</li> <li>3. Determine whether a series is convergent or divergent (H.2.d)</li> <li>4. Use sigma notation (H.2.e)</li> </ol>	<p>Arithmetic sequence, arithmetic mean. Arithmetic series, binomial theorem, common difference, common ratio, convergent series, divergent series, geometric mean, geometric sequence, geometric series, index of summation, infinite sequence, infinite series, <math>n</math> factorial, Pascal's triangle, recursive formula, sequence, sigma notation, term</p>
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School: CCHS

Subject: Precalculus

Grade: 12

***Benchmark Assessment 4***

Instructional Timeline:  
Units 9,10 Term 4

**Dependent upon Learning check schedule**

Topic(s): Conics, Calculus

Kentucky Core Academic Standards

Learning Targets (I Can Statements)

Key Vocabulary

**Unit 9 Conics**

E.3.a Identify conic sections (e.g., parabola, circle, ellipse, hyperbola) from their equations in standard form

E.3.b Graph circles and parabolas and their translations from given equations or characteristics with and without technology  
E.3.c Determine characteristics of circles and parabolas from their equations and graphs

E.1.d Solve quadratic systems graphically and algebraically with and without technology

**Unit 9 Conics**

1. Use the standard and general forms of circles, parabolas, ellipses and hyperbolas(E.3.b)
2. Graph circles, parabolas, ellipses, and hyperbolas.(E.3.c)
3. Recognize conic sections by their equations (E.3.a)
4. Find the equations of conic sections that have been translated (E.3.b)
5. Graph and solve systems of second-degree equations and inequalities (E.1.d)

Asymptotes, axis of symmetry, center, circle, concentric, conic section, conjugate axis, directrix, eccentricity, ellipse, focus, hyperbola, locus, major axis, minor axis, radius, transverse axis, vertex.

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<p><b><u>Unit 10 Calculus (as time permits)</u></b> N/A</p>	<p><b><u>UNIT 10 Calculus (as time permits)</u></b></p> <ol style="list-style-type: none"><li>1. Evaluate limits of functions</li><li>2. Determine the derivatives and anti-derivatives of polynomial functions</li><li>3. Evaluate definite integrals using limits and the fundamental Theorem of calculus</li></ol>	<p>Limit, derivative, tangent line, secant line, differentiation, antiderivative, rate of change, integrals, definite integral, integration, fundamental theorem of calculus, indefinite integral,</p>
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