NCEOC Tutorials for North Carolina are designed specifically for the North Carolina Standard Course of Study, to prepare students for the North Carolina End of Course exam (NCEOC). EOC Categories are at the heart of NCEOC Tutorial structure – bringing category-based learning to the student experience, and category-based performance and progress tracking to the teacher experience.

Math Tutorials offer targeted instruction, practice and review designed to develop computational fluency, deepen conceptual understanding, and apply mathematical practices. They automatically identify and address learning gaps down to elementary-level content, using adaptive remediation to bring students to grade-level no matter where they start. Students engage with the content in an interactive, feedback-rich environment as they progress through standards-aligned modules. By constantly honing the ability to apply their knowledge in abstract and real world scenarios, students build the depth of knowledge and higher order skills required to demonstrate their mastery when put to the test.

In each module, the Learn It and Try It make complex ideas accessible to students through focused content, modeled logic and process, multi-modal representations, and personalized feedback as students reason through increasingly challenging problems. The Review It offers a high impact summary of key concepts and relates those concepts to students' lives. The Test It assesses students' mastery of the module's concepts, providing granular performance data to students and teachers after each attempt. To help students focus on the content most relevant to them, unit-level pretests and posttests can quickly identify where students are strong and where they're still learning.

Test-Taking Strategies for EOC Tutorials allow students to practice and apply learning approaches that will hone their test-taking skills and focus them for success on the day of their EOC test.

Unit 1: Functions

- **FUNCTIONS AND RELATIONS**
  - NC.M3.F-IF.2: Functions Interpreting Functions Understand the concept of a function and use function notation. Use function notation to evaluate piecewise defined functions for inputs in their domains, and interpret statements that use function notation in terms of a context.
- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - NC.M3.F-IF.9: Functions Interpreting Functions Analyze functions using different representations. Compare key features of two functions using different representations by comparing properties of two different functions, each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).

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- NC.M3.F-LE.3: Functions Linear, Quadratic, and Exponential Models Construct and compare linear and exponential models and solve problems. Compare the end behavior of functions using their rates of change over intervals of the same length to show that a quantity increasing exponentially eventually exceeds a quantity increasing as a polynomial function.

Unit 2: Systems of Linear Equations

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - NC.M3.A-CED.3: Algebra Creating Equations Create equations that describe numbers or relationships. Create systems of equations and/or inequalities to model situations in context.
  - NC.M3.A-REI.11: Algebra Reasoning with Equations and Inequalities Represent and solve equations and inequalities graphically. Extend an understanding that the -coordinates of the points where the graphs of two equations =() and =() intersect are the solutions of the equation ()=() and approximate solutions using a graphing technology or successive approximations with a table of values.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - NC.M3.A-CED.3: Algebra Creating Equations Create equations that describe numbers or relationships. Create systems of equations and/or inequalities to model situations in context.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - NC.M3.A-CED.3: Algebra Creating Equations Create equations that describe numbers or relationships. Create systems of equations and/or inequalities to model situations in context.
- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**
  - NC.M3.A-CED.3: Algebra Creating Equations Create equations that describe numbers or relationships. Create systems of equations and/or inequalities to model situations in context.

Unit 3: Working with Functions

- **ARITHMETIC OPERATIONS ON FUNCTIONS**
  - NC.M3.F-BF.1b: Functions Building Functions Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Build a new function, in terms of a context, by combining standard function types using arithmetic operations.
- **INVERSE FUNCTIONS**
  - NC.M3.F-BF.4b: Functions Building Functions Build new functions from existing functions. Find an inverse function. Determine if an inverse function exists by analyzing tables, graphs, and equations.
  - NC.M3.F-BF.4a: Functions Building Functions Build new functions from existing functions. Find an inverse function. Understand the inverse relationship between exponential and logarithmic, quadratic and square root, and linear to linear functions and use this relationship to solve problems using tables, graphs, and equations.
  - NC.M3.F-BF.4c: Functions Building Functions Build new functions from existing functions. Find an inverse function. If an inverse function exists for a linear, quadratic and/or exponential function, , represent the inverse function, , with a table, graph, or equation and use it to solve problems in terms of a context.

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Unit 4: Analyzing Functions

- **LINEAR VERSUS NONLINEAR FUNCTIONS**
  - NC.M3.F-IF.9: Functions Interpreting Functions Analyze functions using different representations. Compare key features of two functions using different representations by comparing properties of two different functions, each with a different representation (symbolically, graphically, numerically in tables, or by verbal descriptions).
- **ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS**
  - NC.M3.F-BF.3: Functions Building Functions Build new functions from existing functions. Extend an understanding of the effects on the graphical and tabular representations of a function when replacing () with (), () + , (+) to include ( ) for specific values of (both positive and negative).
  - NC.M3.F-BF.4a: Functions Building Functions Build new functions from existing functions. Find an inverse function. Understand the inverse relationship between exponential and logarithmic, quadratic and square root, and linear to linear functions and use this relationship to solve problems using tables, graphs, and equations.

Unit 5: Nonlinear Functions

- **ABSOLUTE VALUE FUNCTIONS**
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
  - NC.M3.A-SSE.1a: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Identify and interpret parts of a piecewise, absolute value, polynomial, exponential and rational expressions including terms, factors, coefficients, and exponents.
  - NC.M3.A-SSE.1b: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Interpret expressions composed of multiple parts by viewing one or more of their parts as a single entity to give meaning in terms of a context.
  - NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
  - NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities.
- **EXPONENTIAL FUNCTIONS**

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- NC.M3.A-SSE.1a: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Identify and interpret parts of a piecewise, absolute value, polynomial, exponential and rational expressions including terms, factors, coefficients, and exponents.
- NC.M3.A-SSE.1b: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Interpret expressions composed of multiple parts by viewing one or more of their parts as a single entity to give meaning in terms of a context.
- NC.M3.A-SSE.2: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to write equivalent expressions.
- NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
- NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
- NC.M3.A-SSE.3c: Algebra Seeing Structure in Expressions Write expressions in equivalent forms to solve problems. Write an equivalent form of an exponential expression by using the properties of exponents to transform expressions to reveal rates based on different intervals of the domain.
- NC.M3.F-BF.1a: Functions Building Functions Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Build polynomial and exponential functions with real solution(s) given a graph, a description of a relationship, or ordered pairs (include reading these from a table).
- NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities.

- **EXPONENTIAL GROWTH AND DECAY**
  - NC.M3.A-SSE.1a: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Identify and interpret parts of a piecewise, absolute value, polynomial, exponential and rational expressions including terms, factors, coefficients, and exponents.
  - NC.M3.A-SSE.1b: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Interpret expressions composed of multiple parts by viewing one or more of their parts as a single entity to give meaning in terms of a context.

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- NC.M3.A-SSE.2: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to write equivalent expressions.
- NC.M3.A-SSE.3c: Algebra Seeing Structure in Expressions Write expressions in equivalent forms to solve problems. Write an equivalent form of an exponential expression by using the properties of exponents to transform expressions to reveal rates based on different intervals of the domain.
- NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
- NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
- NC.M3.F-BF.1a: Functions Building Functions Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Build polynomial and exponential functions with real solution(s) given a graph, a description of a relationship, or ordered pairs (include reading these from a table).
- NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities.

- **SOLVING EXPONENTIAL EQUATIONS**
  - NC.M3.A-CED.1: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations and inequalities in one variable that represent absolute value, polynomial, exponential, and rational relationships and use them to solve problems algebraically and graphically.
  - NC.M3.A-REI.1: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Justify a solution method for equations and explain each step of the solving process using mathematical reasoning.
  - NC.M3.F-LE.4: Functions Linear, Quadratic, and Exponential Models Construct and compare linear and exponential models and solve problems. Use logarithms to express the solution to ab to the ct power = where , , and are numbers and evaluate the logarithm using technology.

Unit 6: Logarithmic Expressions and Functions

- **EVALUATING LOGARITHMIC EXPRESSIONS**
  - NC.M3.F-BF.4a: Functions Building Functions Build new functions from existing functions. Find an inverse function. Understand the inverse relationship between exponential and logarithmic, quadratic and square root, and linear to linear functions and use this relationship to solve problems using tables, graphs, and equations.

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- NC.M3.F-LE.4: Functions Linear, Quadratic, and Exponential Models Construct and compare linear and exponential models and solve problems. Use logarithms to express the solution to ab to the ct power = where , , and are numbers and evaluate the logarithm using technology.

- **LOGARITHMIC FUNCTIONS**
  - NC.M3.F-BF.4a: Functions Building Functions Build new functions from existing functions. Find an inverse function. Understand the inverse relationship between exponential and logarithmic, quadratic and square root, and linear to linear functions and use this relationship to solve problems using tables, graphs, and equations.
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
  - NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.

Unit 7: Transformations of Functions

- **PARENT FUNCTIONS**
  - NC.M3.F-BF.3: Functions Building Functions Build new functions from existing functions. Extend an understanding of the effects on the graphical and tabular representations of a function when replacing () with (), () + , (+) to include ( ) for specific values of (both positive and negative).
- **TRANSFORMATIONS OF PARENT FUNCTIONS**
  - NC.M3.F-BF.3: Functions Building Functions Build new functions from existing functions. Extend an understanding of the effects on the graphical and tabular representations of a function when replacing () with (), () + , (+) to include ( ) for specific values of (both positive and negative).
- **MULTIPLE TRANSFORMATIONS OF PARENT FUNCTIONS**
  - NC.M3.F-BF.3: Functions Building Functions Build new functions from existing functions. Extend an understanding of the effects on the graphical and tabular representations of a function when replacing () with (), () + , (+) to include ( ) for specific values of (both positive and negative).

Unit 8: Working with Polynomials

- **DIVISION OF POLYNOMIALS**
  - NC.M3.A-APR.3: Algebra Arithmetic with Polynomial and Rational Expressions Understand the relationship between zeros and factors of polynomials. Understand the relationship among factors of a polynomial expression, the solutions of a polynomial equation and the zeros of a polynomial function.
- **FACTOR THEOREM AND REMAINDER THEOREM**

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- NC.M3.A-APR.3: Algebra Arithmetic with Polynomial and Rational Expressions Understand the relationship between zeros and factors of polynomials. Understand the relationship among factors of a polynomial expression, the solutions of a polynomial equation and the zeros of a polynomial function.
- NC.M3.A-APR.2: Algebra Arithmetic with Polynomial and Rational Expressions Understand the relationship between zeros and factors of polynomials. Understand and apply the Remainder Theorem.

Unit 9: Polynomials and Polynomial Functions

- **FACTORING HIGHER-ORDER POLYNOMIALS**
  - NC.M3.A-APR.3: Algebra Arithmetic with Polynomial and Rational Expressions Understand the relationship between zeros and factors of polynomials. Understand the relationship among factors of a polynomial expression, the solutions of a polynomial equation and the zeros of a polynomial function.
  - NC.M3.A-SSE.2: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Use the structure of an expression to identify ways to write equivalent expressions.
- **GRAPHS OF POLYNOMIAL FUNCTIONS**
  - NC.M3.A-APR.3: Algebra Arithmetic with Polynomial and Rational Expressions Understand the relationship between zeros and factors of polynomials. Understand the relationship among factors of a polynomial expression, the solutions of a polynomial equation and the zeros of a polynomial function.
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
  - NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
  - NC.M3.F-BF.1a: Functions Building Functions Build a function that models a relationship between two quantities. Write a function that describes a relationship between two quantities. Build polynomial and exponential functions with real solution(s) given a graph, a description of a relationship, or ordered pairs (include reading these from a table).
  - NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities.
  - NC.M3.A-SSE.1a: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Identify and interpret parts of a

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piecewise, absolute value, polynomial, exponential and rational expressions including terms, factors, coefficients, and exponents.

- NC.M3.A-SSE.1b: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Interpret expressions composed of multiple parts by viewing one or more of their parts as a single entity to give meaning in terms of a context.

Unit 10: Polynomial Identities and Complex Numbers

- **POLYNOMIAL IDENTITIES**
  - NC.M3.N-CN.9: Number and Quantity The Complex Number System Use complex numbers in polynomial identities and equations. Use the Fundamental Theorem of Algebra to determine the number and potential types of solutions for polynomial functions.
- **POLYNOMIAL IDENTITIES AND COMPLEX NUMBERS**
  - NC.M3.N-CN.9: Number and Quantity The Complex Number System Use complex numbers in polynomial identities and equations. Use the Fundamental Theorem of Algebra to determine the number and potential types of solutions for polynomial functions.

Unit 11: Rational Expressions and Equations

- **OPERATIONS WITH RATIONAL EXPRESSIONS**
  - NC.M3.A-SSE.1a: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Identify and interpret parts of a piecewise, absolute value, polynomial, exponential and rational expressions including terms, factors, coefficients, and exponents.
  - NC.M3.A-SSE.1b: Algebra Seeing Structure in Expressions Interpret the structure of expressions. Interpret expressions that represent a quantity in terms of its context. Interpret expressions composed of multiple parts by viewing one or more of their parts as a single entity to give meaning in terms of a context.
  - NC.M3.A-APR.7b: Algebra Arithmetic with Polynomial and Rational Expressions Rewrite rational expressions. Understand the similarities between arithmetic with rational expressions and arithmetic with rational numbers. Multiply and divide two rational expressions.
  - NC.M3.A-APR.7a: Algebra Arithmetic with Polynomial and Rational Expressions Rewrite rational expressions. Understand the similarities between arithmetic with rational expressions and arithmetic with rational numbers. Add and subtract two rational expressions, () and (), where the denominators of both () and () are linear expressions.
  - NC.M3.A-APR.6: Algebra Arithmetic with Polynomial and Rational Expressions Rewrite rational expressions. Rewrite simple rational expressions in different forms; write ()/() in the form () + ()/(), where (),(),(), and () are polynomials with the degree of () less than the degree of ().
  - NC.M3.A-APR.7a: Algebra Arithmetic with Polynomial and Rational Expressions Rewrite rational expressions. Understand the similarities between arithmetic with rational expressions and arithmetic

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with rational numbers. Add and subtract two rational expressions, () and (), where the denominators of both () and () are linear expressions.

- **SOLVING RATIONAL EQUATIONS**
  - NC.M3.A-REI.2: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Solve and interpret one variable rational equations arising from a context, and explain how extraneous solutions may be produced.
  - NC.M3.A-CED.1: Algebra Creating Equations Create equations that describe numbers or relationships. Create equations and inequalities in one variable that represent absolute value, polynomial, exponential, and rational relationships and use them to solve problems algebraically and graphically.
  - NC.M3.A-REI.1: Algebra Reasoning with Equations and Inequalities Understand solving equations as a process of reasoning and explain the reasoning. Justify a solution method for equations and explain each step of the solving process using mathematical reasoning.

Unit 12: Rational Functions

- **ANALYZING GRAPHS OF RATIONAL FUNCTIONS**
  - NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and rational relationships between quantities.
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
  - NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
- **MODELING SITUATIONS WITH RATIONAL FUNCTIONS**
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.
  - NC.M3.F-IF.7: Functions Interpreting Functions Analyze functions using different representations. Analyze piecewise, absolute value, polynomials, exponential, rational, and trigonometric functions (sine and cosine) using different representations to show key features of the graph, by hand in simple cases and using technology for more complicated cases, including: domain and range; intercepts; intervals where the function is increasing, decreasing, positive, or negative; rate of change; relative maximums and minimums; symmetries; end behavior; period; and discontinuities.
  - NC.M3.A-CED.2: Algebra Creating Equations Create equations that describe numbers or relationships. Create and graph equations in two variables to represent absolute value, polynomial, exponential and

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rational relationships between quantities.

Unit 13: Systems of Nonlinear Equations

- **SYSTEMS OF NONLINEAR EQUATIONS**
  - NC.M3.A-REI.11: Algebra Reasoning with Equations and Inequalities Represent and solve equations and inequalities graphically. Extend an understanding that the -coordinates of the points where the graphs of two equations =() and =() intersect are the solutions of the equation ()=() and approximate solutions using a graphing technology or successive approximations with a table of values.
  - NC.M3.A-CED.3: Algebra Creating Equations Create equations that describe numbers or relationships. Create systems of equations and/or inequalities to model situations in context.
  - NC.M3.A-REI.11: Algebra Reasoning with Equations and Inequalities Represent and solve equations and inequalities graphically. Extend an understanding that the -coordinates of the points where the graphs of two equations =() and =() intersect are the solutions of the equation ()=() and approximate solutions using a graphing technology or successive approximations with a table of values.
  - NC.M3.A-REI.11: Algebra Reasoning with Equations and Inequalities Represent and solve equations and inequalities graphically. Extend an understanding that the -coordinates of the points where the graphs of two equations =() and =() intersect are the solutions of the equation ()=() and approximate solutions using a graphing technology or successive approximations with a table of values.
  - NC.M3.A-REI.11: Algebra Reasoning with Equations and Inequalities Represent and solve equations and inequalities graphically. Extend an understanding that the -coordinates of the points where the graphs of two equations =() and =() intersect are the solutions of the equation ()=() and approximate solutions using a graphing technology or successive approximations with a table of values.

Unit 14: Geometry

- **TRIANGLE BISECTORS**
  - NC.M3.G-CO.14: Geometry Congruence Prove geometric theorems. Apply properties, definitions, and theorems of two-dimensional figures to prove geometric theorems and solve problems.
  - NC.M3.G-CO.10: Geometry Congruence Prove geometric theorems. Verify experimentally properties of the centers of triangles (centroid, incenter, and circumcenter).
- **MEDIANS AND ALTITUDES OF TRIANGLES**
  - NC.M3.G-CO.14: Geometry Congruence Prove geometric theorems. Apply properties, definitions, and theorems of two-dimensional figures to prove geometric theorems and solve problems.
  - NC.M3.G-CO.10: Geometry Congruence Prove geometric theorems. Verify experimentally properties of the centers of triangles (centroid, incenter, and circumcenter).
- **PARALLELOGRAMS AND RECTANGLES**
  - NC.M3.G-CO.14: Geometry Congruence Prove geometric theorems. Apply properties, definitions, and theorems of two-dimensional figures to prove geometric theorems and solve problems.
  - NC.M3.G-CO.11: Geometry Congruence Prove geometric theorems. Prove theorems about parallelograms. Opposite sides of a parallelogram are congruent. Opposite angles of a parallelogram

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are congruent. Diagonals of a parallelogram bisect each other. If the diagonals of a parallelogram are congruent, then the parallelogram is a rectangle.

- **SQUARES AND RHOMBI**
  - NC.M3.G-CO.14: Geometry Congruence Prove geometric theorems. Apply properties, definitions, and theorems of two-dimensional figures to prove geometric theorems and solve problems.

Unit 15: Trigonometry and Trigonometric Functions

- **RADIANS AND THE UNIT CIRCLE**
  - NC.M3.F-TF.1: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. Understand radian measure of an angle as: The ratio of the length of an arc on a circle subtended by the angle to its radius. A dimensionless measure of length defined by the quotient of arc length and radius that is a real number. The domain for trigonometric functions.
  - NC.M3.F-IF.1: Functions Interpreting Functions Understand the concept of a function and use function notation. Extend the concept of a function by recognizing that trigonometric ratios are functions of angle measure.
  - NC.M3.F-TF.2a: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. Build an understanding of trigonometric functions by using tables, graphs and technology to represent the cosine and sine functions. Interpret the sine function as the relationship between the radian measure of an angle formed by the horizontal axis and a terminal ray on the unit circle and its y coordinate.
  - NC.M3.F-TF.2b: Functions Trigonometric Functions Extend the domain of trigonometric functions using the unit circle. Build an understanding of trigonometric functions by using tables, graphs and technology to represent the cosine and sine functions. Interpret the cosine function as the relationship between the radian measure of an angle formed by the horizontal axis and a terminal ray on the unit circle and its x coordinate.
  - NC.M3.F-TF.5: Functions Trigonometric Functions Model periodic phenomena with trigonometric functions. Use technology to investigate the parameters, , , and of a sine function, () = ( ) + , to represent periodic phenomena and interpret key features in terms of a context.
- **TRIGONOMETRIC FUNCTIONS**
  - NC.M3.F-IF.1: Functions Interpreting Functions Understand the concept of a function and use function notation. Extend the concept of a function by recognizing that trigonometric ratios are functions of angle measure.
  - NC.M3.F-TF.5: Functions Trigonometric Functions Model periodic phenomena with trigonometric functions. Use technology to investigate the parameters, , , and of a sine function, () = ( ) + , to represent periodic phenomena and interpret key features in terms of a context.
  - NC.M3.F-IF.4: Functions Interpreting Functions Interpret functions that arise in applications in terms of the context. Interpret key features of graphs, tables, and verbal descriptions in context to describe functions that arise in applications relating two quantities to include periodicity and discontinuities.

Unit 16: Circles

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- **CIRCLE BASICS**
  - NC.M3.G-C.2: Geometry Circles Understand and apply theorems about circles. Understand and apply theorems about circles. Understand and apply theorems about relationships with angles and circles, including central, inscribed and circumscribed angles. Understand and apply theorems about relationships with line segments and circles including, radii, diameter, secants, tangents and chords.
- **CENTRAL ANGLES, INSCRIBED ANGLES, AND CHORDS**
  - NC.M3.G-C.2: Geometry Circles Understand and apply theorems about circles. Understand and apply theorems about circles. Understand and apply theorems about relationships with angles and circles, including central, inscribed and circumscribed angles. Understand and apply theorems about relationships with line segments and circles including, radii, diameter, secants, tangents and chords.
- **SECANTS, ANGLES, AND INTERCEPTED ARCS**
  - NC.M3.G-C.2: Geometry Circles Understand and apply theorems about circles. Understand and apply theorems about circles. Understand and apply theorems about relationships with angles and circles, including central, inscribed and circumscribed angles. Understand and apply theorems about relationships with line segments and circles including, radii, diameter, secants, tangents and chords.
- **TANGENTS, ANGLES, AND INTERCEPTED ARCS**
  - NC.M3.G-C.2: Geometry Circles Understand and apply theorems about circles. Understand and apply theorems about circles. Understand and apply theorems about relationships with angles and circles, including central, inscribed and circumscribed angles. Understand and apply theorems about relationships with line segments and circles including, radii, diameter, secants, tangents and chords.

Unit 17: Circles and Properties of Circles

- **CIRCUMFERENCE AND ARC LENGTH**
  - NC.M3.G-C.5: Geometry Circles Understand and apply theorems about circles. Using similarity, demonstrate that the length of an arc, s, for a given central angle is proportional to the radius, r, of the circle. Define radian measure of the central angle as the ratio of the length of the arc to the radius of the circle, s/r. Find arc lengths and areas of sectors of circles.
- **AREA OF CIRCLES AND SECTORS**
  - NC.M3.G-C.5: Geometry Circles Understand and apply theorems about circles. Using similarity, demonstrate that the length of an arc, s, for a given central angle is proportional to the radius, r, of the circle. Define radian measure of the central angle as the ratio of the length of the arc to the radius of the circle, s/r. Find arc lengths and areas of sectors of circles.
- **CIRCLES**
  - NC.M3.G-GPE.1: Geometry Expressing Geometric Properties with Equations Translate between the geometric description and the equation for a conic section. 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.

Unit 18: Three-Dimensional Solids

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- **RELATING TWO-DIMENSIONAL FIGURES TO THREE-DIMENSIONAL SOLIDS**
  - NC.M3.G-GMD.4: Geometry Geometric Measurement & Dimension Visualize relationships between two-dimensional and three-dimensional objects. Identify the shapes of two-dimensional cross-sections of three-dimensional objects, and identify three-dimensional objects generated by rotations of two-dimensional objects.
- **SURFACE AREA AND VOLUME OF SPHERES**
  - NC.M3.G-GMD.3: Geometry Geometric Measurement & Dimension Explain volume formulas and use them to solve problems. Use the volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems.

Unit 19: Volume

- **VOLUME OF PRISMS AND PYRAMIDS**
  - NC.M3.G-GMD.3: Geometry Geometric Measurement & Dimension Explain volume formulas and use them to solve problems. Use the volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems.
- **VOLUME OF CYLINDERS AND CONES**
  - NC.M3.G-GMD.3: Geometry Geometric Measurement & Dimension Explain volume formulas and use them to solve problems. Use the volume formulas for prisms, cylinders, pyramids, cones, and spheres to solve problems.
- **MODELING SITUATIONS WITH GEOMETRY**
  - NC.M3.G-MG.1: Geometry Modeling with Geometry Apply geometric concepts in modeling situations. Apply geometric concepts in modeling situations: Use geometric and algebraic concepts to solve problems in modeling situations. Use geometric shapes, their measures, and their properties, to model real-life objects. Use geometric formulas and algebraic functions to model relationships. Apply concepts of density based on area and volume. Apply geometric concepts to solve design and optimization problems.

Unit 20: Statistics

- **EXPERIMENTAL AND OBSERVATIONAL DESIGN**
  - NC.M3.S-IC.6: Statistics and Probability Making Inference and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Evaluate articles and websites that report data by identifying the source of the data, the design of the study, and the way the data are graphically displayed.
  - NC.M3.S-IC.3: Statistics and Probability Making Inference and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Recognize the purposes of and differences between sample surveys, experiments, and observational studies and understand how randomization should be used in each.
- **ANALYZING STATISTICAL SAMPLES**

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- NC.M3.S-IC.1: Statistics and Probability Making Inference and Justifying Conclusions Understand and evaluate random processes underlying statistical experiments. Understand the process of making inferences about a population based on a random sample from that population.
- NC.M3.S-IC.6: Statistics and Probability Making Inference and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Evaluate articles and websites that report data by identifying the source of the data, the design of the study, and the way the data are graphically displayed.
- NC.M3.S-IC.4: Statistics and Probability Making Inference and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use simulation to understand how samples can be used to estimate a population mean or proportion and how to determine a margin of error for the estimate.

- **CONCLUSIONS IN DATA**
  - NC.M3.S-IC.1: Statistics and Probability Making Inference and Justifying Conclusions Understand and evaluate random processes underlying statistical experiments. Understand the process of making inferences about a population based on a random sample from that population.
  - NC.M3.S-IC.5: Statistics and Probability Making Inference and Justifying Conclusions Make inferences and justify conclusions from sample surveys, experiments, and observational studies. Use simulation to determine whether observed differences between samples from two distinct populations indicate that the two populations are actually different in terms of a parameter of interest.

Unit 21: Test-Taking Strategies

- **STUDY HABITS**
- **BEING PREPARED AND GETTING STARTED**
- **WORDING IN TEST QUESTIONS**
- **WORDING IN ANSWER CHOICES**
- **QUESTIONS WITH PASSAGES AND VISUAL DATA**
- **ESSAY AND SHORT ANSWER QUESTIONS**
- **WORD PROBLEMS**

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