SOL EOC Tutorials for Virginia are designed specifically for the Virginia Standards of Learning to prepare students for the Standards of Learning tests (SOL). EOC Categories are at the heart of SOL EOC 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: Quadratic Functions

- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - F.AII.7.f: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include values of a function for elements in its domain;
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
  - F.AII.7.b: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intervals in which a function is increasing or decreasing;

- F.AII.7.h: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include end behavior;
- F.AII.7.e: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts;
- F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.
- F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;

- **REPRESENTATIONS OF QUADRATIC FUNCTIONS**
  - F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
  - F.AII.7.k: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include composition of functions algebraically and graphically.

Unit 2: Solving Quadratic Equations

- **SOLVING QUADRATIC FUNCTIONS BY FACTORING**
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.
  - F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
- **COMPLETING THE SQUARE**
  - F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;

- F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.

- **QUADRATIC FORMULA**
  - F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.

Unit 3: Complex Numbers

- **COMPLEX NUMBERS**
  - EO.AII.2: Expressions and Operations The student will perform operations on complex numbers and express the results in simplest form using patterns of the powers of .

Unit 4: Complex Numbers and Quadratic Functions

- **COMPLEX NUMBERS AND QUADRATIC FUNCTIONS**
  - EI.AII.3.b: Equations and Inequalities The student will solve quadratic equations over the set of complex numbers;

Unit 5: Exponential Functions

- **EXPONENTIAL FUNCTIONS**
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
  - F.AII.7.b: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intervals in which a function is increasing or decreasing;
- **SOLVING EXPONENTIAL EQUATIONS**
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
  - F.AII.7.d: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include zeros;
  - F.AII.7.e: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts;
  - F.AII.7.i: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and

graphically. Key concepts include vertical and horizontal asymptotes;

- F.AII.7.k: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include composition of functions algebraically and graphically.
- F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.

Unit 6: Logarithmic Expressions, Equations, and Functions

- **LOGARITHMIC FUNCTIONS**
  - F.AII.7.j: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include inverse of a function; and
- **SOLVING LOGARITHMIC EQUATIONS**
  - F.AII.7.d: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include zeros;
  - F.AII.7.e: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts;
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.

Unit 7: Sequences

- **ARITHMETIC AND GEOMETRIC SEQUENCES**
  - F.AII.5: Functions The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first terms, determining then th term, and evaluating summation formulas. Notation will include and .
- **SUMS OF GEOMETRIC SEQUENCES**
  - F.AII.5: Functions The student will investigate and apply the properties of arithmetic and geometric sequences and series to solve practical problems, including writing the first terms, determining then th term, and evaluating summation formulas. Notation will include and .

Unit 8: Factoring Polynomials

- **FACTORING SPECIAL CASES**
  - EO.AII.1.c: Expressions and Operations The student will factor polynomials completely in one or two variables.
- **FACTORING CUBIC POLYNOMIALS**
  - EO.AII.1.c: Expressions and Operations The student will factor polynomials completely in one or two variables.

- **FACTORING HIGHER-ORDER POLYNOMIALS**
  - EO.AII.1.c: Expressions and Operations The student will factor polynomials completely in one or two variables.

Unit 9: Graphs of Polynomial Functions

- **GRAPHS OF POLYNOMIAL FUNCTIONS**
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
  - F.AII.7.c: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include extrema;
  - F.AII.7.d: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include zeros;
  - F.AII.7.e: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts;
  - F.AII.7.f: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include values of a function for elements in its domain;
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.
  - F.AII.7.h: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include end behavior;
  - F.AII.7.b: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intervals in which a function is increasing or decreasing;

Unit 10: Exponents

- **LAWS OF EXPONENTS**
  - EI.AII.3.d: Equations and Inequalities The student will solve equations containing radical expressions.

Unit 11: Radical and Rational Expressions

- **ADVANCED PROPERTIES OF SQUARE ROOT EXPRESSIONS**
  - EO.AII.1.b: Expressions and Operations The student will add, subtract, multiply, divide, and simplify radical expressions containing rational numbers and variables, and expressions containing rational exponents; and
- **OPERATIONS WITH RATIONAL EXPRESSIONS**

- EO.AII.1.a: Expressions and Operations The student will add, subtract, multiply, divide, and simplify rational algebraic expressions;

Unit 12: Solving Radical Equations

- **SOLVING SQUARE ROOT EQUATIONS**
  - EI.AII.3.d: Equations and Inequalities The student will solve equations containing radical expressions.

Unit 13: Solving Rational Equations

- **SOLVING RATIONAL EQUATIONS**
  - EI.AII.3.c: Equations and Inequalities The student will solve equations containing rational algebraic expressions; and
  - F.AII.7.d: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include zeros;

Unit 14: Radical and Rational Functions

- **ANALYZING GRAPHS OF SQUARE ROOT FUNCTIONS**
  - F.AII.7.j: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include inverse of a function; and
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;
- **ANALYZING GRAPHS OF RATIONAL FUNCTIONS**
  - F.AII.7.d: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include zeros;
  - F.AII.8: Functions The student will investigate and describe the relationships among solutions of an equation, zeros of a function, x-intercepts of a graph, and factors of a polynomial expression.
  - F.AII.7.i: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include vertical and horizontal asymptotes;
  - F.AII.7.g: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include connections between and among multiple representations of functions using verbal descriptions, tables, equations, and graphs;
  - F.AII.7.a: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include domain, range, and continuity;

- F.AII.7.f: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include values of a function for elements in its domain;

- **MODELING SITUATIONS WITH RATIONAL FUNCTIONS**
  - F.AII.7.e: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include intercepts;
  - F.AII.7.i: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include vertical and horizontal asymptotes;

Unit 15: Nonlinear Functions and Equations

- **ABSOLUTE VALUE FUNCTIONS**
  - EI.AII.3.a: Equations and Inequalities The student will solve absolute value linear equations and inequalities;
- **SYSTEMS OF NONLINEAR EQUATIONS**
  - EI.AII.4: Equations and Inequalities The student will solve systems of linear-quadratic and quadratic-quadratic equations, algebraically and graphically.

Unit 16: Direct and Inverse Variation

- **INVERSE VARIATION**
  - S.AII.10: Statistics The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.
- **MODELING SITUATIONS WITH DIRECT AND INVERSE VARIATION**
  - S.AII.10: Statistics The student will represent and solve problems, including practical problems, involving inverse variation, joint variation, and a combination of direct and inverse variations.

Unit 17: Parent and Inverse Functions

- **PARENT FUNCTIONS**
  - F.AII.6.a: Functions For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will recognize the general shape of function families; and
- **INVERSE FUNCTIONS**
  - F.AII.7.j: Functions The student will investigate and analyze linear, quadratic, absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic function families algebraically and graphically. Key concepts include inverse of a function; and

Unit 18: Working with Functions

- **TRANSFORMATIONS OF PARENT FUNCTIONS**
  - F.AII.6.b: Functions For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will use knowledge of transformations to convert between

equations and the corresponding graphs of functions.

- **MULTIPLE TRANSFORMATIONS OF PARENT FUNCTIONS**
  - F.AII.6.b: Functions For absolute value, square root, cube root, rational, polynomial, exponential, and logarithmic functions, the student will use knowledge of transformations to convert between equations and the corresponding graphs of functions.

Unit 19: Statistics and Probability

- **NORMAL DISTRIBUTION**
  - S.AII.11.a: Statistics The student will identify and describe properties of a normal distribution;
  - S.AII.11.c: Statistics The student will apply properties of normal distributions to determine probabilities associated with areas under the standard normal curve.
  - S.AII.11.b: Statistics The student will interpret and compare z-scores for normally distributed data; and
- **COMBINATIONS AND PERMUTATIONS**
  - S.AII.12: Statistics The student will compute and distinguish between permutations and combinations.
- **SCATTERPLOTS AND MODELING**
  - S.AII.9: Statistics The student will collect and analyze data, determine the equation of the curve of best fit in order to make predictions, and solve practical problems, using mathematical models of quadratic and exponential functions.

Unit 20: 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**