SOL EOC Tutorials for Virginia are designed specifically for the Virginia Standards of Learning to prepare students for the Standards of Learning tests.

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: Expressions, Equations, and Inequalities

- **LAWS OF EXPONENTS**
  - A.EO.3.a: Derive the laws of exponents through explorations of patterns, to include products, quotients, and powers of bases.
  - A.EO.3.b: Simplify multivariable expressions and ratios of monomial expressions in which the exponents are integers, using the laws of exponents.
  - A.EO.4.d: Generate equivalent numerical expressions and justify their equivalency for radicals using rational exponents, limited to rational exponents of 1/2 and 1/3 (e.g., v5 = 51/2; v8 = 8 1/3 = (2) 1/3 = 2).
- **FORMULATING AND SIMPLIFYING ALGEBRAIC EXPRESSIONS**
  - A.EO.1.a: Translate between verbal quantitative situations and algebraic expressions, including contextual situations.
- **SIMPLIFYING CUBE ROOTS**

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- A.EO.4.a: Simplify and determine equivalent radical expressions involving the square root of a whole number in simplest form.
- A.EO.4.c: Add, subtract, and multiply radicals, limited to numeric square and cube root expressions.

Unit 2: Multi-Step Equations

- **AXIOMS OF EQUALITY**
  - A.EI.1.b: Solve multistep linear equations in one variable, including those in contextual situations, by applying the properties of real numbers and/or properties of equality.

Unit 3: One-Variable and Literal Equations

- **SOLVING LINEAR EQUATIONS**
  - A.EI.1.e: Determine if a linear equation in one variable has one solution, no solution, or an infinite number of solutions.
- **MULTI-STEP EQUATIONS AND INEQUALITIES**
  - A.EI.1.a: Write a linear equation or inequality in one variable to represent a contextual situation.
  - A.EI.1.b: Solve multistep linear equations in one variable, including those in contextual situations, by applying the properties of real numbers and/or properties of equality.
  - A.EI.1.c: Solve multistep linear inequalities in one variable algebraically and graph the solution set on a number line, including those in contextual situations, by applying the properties of real numbers and/or properties of inequality.
  - A.EI.1.f: Verify possible solution(s) to multistep linear equations and inequalities in one variable algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.
- **LITERAL EQUATIONS**
  - A.EI.1.d: Rearrange a formula or literal equation to solve for a specified variable by applying the properties of equality.

Unit 4: Functions

- **FUNCTIONS AND RELATIONS**
  - A.F.2.a: Determine whether a relation, represented by a set of ordered pairs, a table, a mapping, or a graph is a function; for relations that are functions, determine the domain and range.
- **EXPONENTIAL FUNCTIONS**
  - A.F.2.e: Given an equation or graph of an exponential function in the form y = abx (where b is limited to a natural number), interpret key characteristics, including y-intercepts and domain and range; interpret key characteristics as related to contextual situations, where applicable.
  - A.F.2.f: Graph an exponential function, f(x), in two variables using a variety of strategies, including transformations f(x) + k and kf(x), where k is limited to rational values.
- **LINEAR VS. NONLINEAR FUNCTIONS**

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- A.F.2.h: Compare and contrast the key characteristics of linear functions (f(x) = x), quadratic functions (f(x) = x), and exponential functions (f(x) = bx) using tables and graphs.

Unit 5: Representations of Functions

- **MULTIPLE REPRESENTATIONS OF FUNCTIONS**
  - A.EO.2.e: Represent and demonstrate equality of quadratic expressions in different forms (e.g., concrete, verbal, symbolic, and graphical).

Unit 6: Domain and Range

- **DOMAIN AND RANGE**
  - A.F.2.a: Determine whether a relation, represented by a set of ordered pairs, a table, a mapping, or a graph is a function; for relations that are functions, determine the domain and range.
- **EVALUATING FUNCTIONS**
  - A.F.2.g: For any value, x, in the domain of f, determine f(x) of a quadratic or exponential function. Determine x given any value f(x) in the range of f of a quadratic function. Explain the meaning of x and f(x) in context.

Unit 7: Graphs of Linear Functions

- **SLOPE**
  - A.F.1.a: Determine and identify the domain, range, zeros, slope, and intercepts of a linear function, presented algebraically or graphically, including the interpretation of these characteristics in contextual situations.
- **GRAPHING AND ANALYZING LINEAR FUNCTIONS**
  - A.F.1.a: Determine and identify the domain, range, zeros, slope, and intercepts of a linear function, presented algebraically or graphically, including the interpretation of these characteristics in contextual situations.
  - A.F.1.d.i: given the graph of a line;
  - A.F.1.g: For any value, x, in the domain of f, determine f(x), and determine x given any value f(x) in the range of f, given an algebraic or graphical representation of a linear function.
  - A.F.1.h: Compare and contrast the characteristics of linear functions represented algebraically, graphically, in tables, and in contextual situations.
- **GRAPHING AND MANIPULATING Y = MX + B**
  - A.F.1.b: Investigate and explain how transformations to the parent function y = x affect the rate of change (slope) and the y-intercept of a linear function.
  - A.F.1.c: Write equivalent algebraic forms of linear functions, including slope-intercept form, standard form, and point-slope form, and analyze and interpret the information revealed by each form.
  - A.F.1.d.iv: vertical lines as x = a; and
  - A.F.1.d.v: horizontal lines as y = c.

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Unit 8: Linear Equations

- **SLOPE-INTERCEPT FORM OF A LINEAR EQUATION**
  - A.F.1.a: Determine and identify the domain, range, zeros, slope, and intercepts of a linear function, presented algebraically or graphically, including the interpretation of these characteristics in contextual situations.
  - A.F.1.c: Write equivalent algebraic forms of linear functions, including slope-intercept form, standard form, and point-slope form, and analyze and interpret the information revealed by each form.
  - A.F.1.d.i: given the graph of a line;
  - A.F.1.d.ii: given two points on the line whose coordinates are integers;
  - A.F.1.f: Graph a linear function in two variables, with and without the use of technology, including those that can represent contextual situations.
  - A.ST.1.g: Investigate and explain the meaning of the rate of change (slope) and y-intercept (constant term) of a linear model in context.
- **POINT-SLOPE FORM OF A LINEAR EQUATION**
  - A.F.1.d.ii: given two points on the line whose coordinates are integers;
  - A.F.1.d.iii: given the slope and a point on the line whose coordinates are integers;
  - A.F.1.e: Write the equation of a line parallel or perpendicular to a given line through a given point.
  - A.F.1.f: Graph a linear function in two variables, with and without the use of technology, including those that can represent contextual situations.

Unit 9: Linear Systems

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: GRAPHING**
  - A.EI.2.a: Create a system of two linear equations in two variables to represent a contextual situation.
  - A.EI.2.b: Apply the properties of real numbers and/or properties of equality to solve a system of two linear equations in two variables, algebraically and graphically.
  - A.EI.2.c: Determine whether a system of two linear equations has one solution, no solution, or an infinite number of solutions.
  - A.EI.2.h: Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.
- **SOLVING SYSTEMS OF LINEAR EQUATIONS: SUBSTITUTION**
  - A.EI.2.a: Create a system of two linear equations in two variables to represent a contextual situation.
  - A.EI.2.b: Apply the properties of real numbers and/or properties of equality to solve a system of two linear equations in two variables, algebraically and graphically.

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- A.EI.2.h: Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.

- **SOLVING SYSTEMS OF LINEAR EQUATIONS: ELIMINATION**
  - A.EI.2.a: Create a system of two linear equations in two variables to represent a contextual situation.
  - A.EI.2.b: Apply the properties of real numbers and/or properties of equality to solve a system of two linear equations in two variables, algebraically and graphically.
  - A.EI.2.h: Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.

Unit 10: Linear Inequalities

- **GRAPHS OF LINEAR INEQUALITIES**
  - A.EI.2.d: Create a linear inequality in two variables to represent a contextual situation.
  - A.EI.2.e: Represent the solution of a linear inequality in two variables graphically on a coordinate plane.
  - A.EI.2.h: Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.
- **SOLVING SYSTEMS OF LINEAR INEQUALITIES**
  - A.EI.2.f: Create a system of two linear inequalities in two variables to represent a contextual situation.
  - A.EI.2.g: Represent the solution set of a system of two linear inequalities in two variables, graphically on a coordinate plane.
  - A.EI.2.h: Verify possible solution(s) to a system of two linear equations, a linear inequality in two variable, or a system of two linear inequalities algebraically, graphically, and with technology to justify the reasonableness of the answer(s). Explain the solution method and interpret solutions for problems given in context.

Unit 11: Operations with Polynomials

- **POLYNOMIAL BASICS**
  - A.EO.2.a: Determine sums and differences of polynomial expressions in one variable, using a variety of strategies, including concrete objects and their related pictorial and symbolic models.
- **ADDITION AND SUBTRACTION OF POLYNOMIALS**
  - A.EO.2.a: Determine sums and differences of polynomial expressions in one variable, using a variety of strategies, including concrete objects and their related pictorial and symbolic models.

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- **MULTIPLICATION OF POLYNOMIALS**
  - A.EO.2.b: Determine the product of polynomial expressions in one variable, using a variety of strategies, including concrete objects and their related pictorial and symbolic models, the application of the distributive property, and the use of area models. The factors should be limited to five or fewer terms (e.g., (4x + 2)(3x + 5) represents four terms and (x + 1)(2x + x + 3) represents five terms).
- **DIVISION OF POLYNOMIALS**
  - A.EO.2.d: Determine the quotient of polynomials, using a monomial or binomial divisor, or a completely factored divisor.

Unit 12: Factoring

- **FACTORING QUADRATIC TRINOMIALS**
  - A.EO.2.c: Factor completely first- and second-degree polynomials in one variable with integral coefficients. After factoring out the greatest common factor (GCF), leading coefficients should have no more than four factors.
- **FACTORING SPECIAL CASES**
  - A.EO.2.c: Factor completely first- and second-degree polynomials in one variable with integral coefficients. After factoring out the greatest common factor (GCF), leading coefficients should have no more than four factors.

Unit 13: Solving Quadratic Equations

- **SOLVING QUADRATIC EQUATIONS BY FACTORING**
  - A.EI.3.a: Solve a quadratic equation in one variable over the set of real numbers with rational or irrational solutions, including those that can be used to solve contextual problems.
  - A.EI.3.c: Verify possible solution(s) to a quadratic equation in one variable algebraically, graphically, and with technology to justify the reasonableness of answer(s). Explain the solution method and interpret solutions for problems given in context.
- **QUADRATIC FORMULA**
  - A.EI.3.a: Solve a quadratic equation in one variable over the set of real numbers with rational or irrational solutions, including those that can be used to solve contextual problems.
  - A.EI.3.b: Determine and justify if a quadratic equation in one variable has no real solutions, one real solution, or two real solutions.

Unit 14: Quadratic Functions 1

- **QUADRATIC FUNCTIONS**
  - A.F.2.b: Given an equation or graph, determine key characteristics of a quadratic function including x-intercepts (zeros), y-intercept, vertex (maximum or minimum), and domain and range (including when restricted by context); interpret key characteristics as related to contextual situations, where applicable.

Unit 15: Quadratic Functions 2

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- **ANALYZING GRAPHS OF QUADRATIC FUNCTIONS**
  - A.F.2.c: Graph a quadratic function, f(x), in two variables using a variety of strategies, including transformations f(x) + k and kf(x), where k is limited to rational values.
  - A.F.2.d: Make connections between the algebraic (standard and factored forms) and graphical representation of a quadratic function.
- **GRAPHING AND WRITING QUADRATIC FUNCTIONS**
  - A.F.2.c: Graph a quadratic function, f(x), in two variables using a variety of strategies, including transformations f(x) + k and kf(x), where k is limited to rational values.

Unit 16: Statistics

- **SCATTERPLOTS**
  - A.ST.1.h: Analyze relationships between two quantitative variables revealed in a scatterplot.
  - A.ST.1.i: Make conclusions based on the analysis of a set of bivariate data and communicate the results.
- **SCATTERPLOTS AND MODELING**
  - A.ST.1.d: Given a table of ordered pairs or a scatterplot representing no more than 30 data points, use available technology to determine whether a linear or quadratic function would represent the relationship, and if so, determine the equation of the curve of best fit.
  - A.ST.1.e: Use linear and quadratic regression methods available through technology to write a linear or quadratic function that represents the data where appropriate and describe the strengths and weaknesses of the model.
  - A.ST.1.f: Use a linear model to predict outcomes and evaluate the strength and validity of these predictions, including through the use of technology.

Unit 17: 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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