Georgia Tutorials are designed specifically for the Georgia Standards of Excellence and the Georgia Performance Standards to prepare students for the Georgia Milestones.

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.

Unit 1: The Number System

- **RATIONAL AND IRRATIONAL NUMBERS**
  - 8.NR.1.1: Distinguish between rational and irrational numbers using decimal expansion. Convert a decimal expansion which repeats eventually into a rational number.
- **APPROXIMATING IRRATIONAL NUMBERS**
  - 8.NR.1.2: Approximate irrational numbers to compare the size of irrational numbers, locate them approximately on a number line, and estimate the value of expressions.

Unit 2: Exponents

- **PROPERTIES OF EXPONENTS**
  - 8.NR.2.1: Apply the properties of integer exponents to generate equivalent numerical expressions.
- **POWERS OF 10**
  - 8.NR.2.3: Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other.
- **SCIENTIFIC NOTATION**
  - 8.NR.2.3: Use numbers expressed in scientific notation to estimate very large or very small quantities, and to express how many times as much one is than the other.

- 8.NR.2.4: Add, subtract, multiply and divide numbers expressed in scientific notation, including problems where both decimal and scientific notation are used. Interpret scientific notation that has been generated by technology (e.g., calculators or online technology tools).

Unit 3: Algebraic Expressions

- **UNDERSTANDING PARTS OF EXPRESSIONS**
  - 8.PAR.3.1: Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors.
- **SIMPLIFYING AND REWRITING ALGEBRAIC EXPRESSIONS**
  - 8.PAR.3.1: Interpret expressions and parts of an expression, in context, by utilizing formulas or expressions with multiple terms and/or factors.

Unit 4: Proportional Reasoning and Slope

- **SLOPE**
  - 8.PAR.4.1: Use the equation = (proportional) for a line through the origin to derive the equation = + (non-proportional) for a line intersecting the vertical axis at .
- **MULTIPLE REPRESENTATIONS OF PROPORTIONS**
  - 8.PAR.4.1: Use the equation = (proportional) for a line through the origin to derive the equation = + (non-proportional) for a line intersecting the vertical axis at .

Unit 5: Functions

- **RELATIONS AND FUNCTIONS**
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.9: Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.
  - 8.PAR.4.2: Show and explain that the graph of an equation representing an applicable situation in two variables is the set of all its solutions plotted in the coordinate plane.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.1: Show and explain that a function is a rule that assigns to each input exactly one output.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.

- **COMPARING FUNCTIONS**
  - 8.FGR.5.8: Explain the meaning of the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
  - 8.FGR.5.2: Within realistic situations, identify and describe examples of functions that are linear or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
  - 8.FGR.5.4: Compare properties (rate of change and initial value) of two functions used to model an authentic situation each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
  - 8.FGR.5.9: Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
- **GRAPHS OF FUNCTIONS**
  - 8.FGR.5.9: Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.
  - 8.FGR.5.2: Within realistic situations, identify and describe examples of functions that are linear or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

Unit 6: Linear Functions and Linear Inequalities

- **SLOPE-INTERCEPT FORM**
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.9: Graph and analyze linear functions expressed in various algebraic forms and show key characteristics of the graph to describe applicable situations.
  - 8.FGR.5.5: Write and explain the equations = + (slope-intercept form), + = (standard form), and ( ) = ( ) (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different properties of the function.
  - 8.FGR.5.6: Write a linear function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
  - 8.FGR.5.2: Within realistic situations, identify and describe examples of functions that are linear or nonlinear. Sketch a graph that exhibits the qualitative features of a function that has been described

verbally.

- 8.PAR.4.2: Show and explain that the graph of an equation representing an applicable situation in two variables is the set of all its solutions plotted in the coordinate plane.
- 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
- 8.FGR.5.8: Explain the meaning of the rate of change and initial value of a linear function in terms of the situation it models, and in terms of its graph or a table of values.
- 8.FGR.5.5: Write and explain the equations = + (slope-intercept form), + = (standard form), and ( ) = ( ) (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different properties of the function.

- **WRITING LINEAR FUNCTIONS**
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.6: Write a linear function defined by an expression in different but equivalent forms to reveal and explain different properties of the function.
  - 8.FGR.5.7: Construct a function to model a linear relationship between two quantities. Determine the rate of change and initial value of the function from a description of a relationship or from two (,) values, including reading these from a table or from a graph.
  - 8.FGR.5.5: Write and explain the equations = + (slope-intercept form), + = (standard form), and ( ) = ( ) (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different properties of the function.
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  - 8.FGR.5.5: Write and explain the equations = + (slope-intercept form), + = (standard form), and ( ) = ( ) (point-slope form) as defining a linear function whose graph is a straight line to reveal and explain different properties of the function.
- **SOLVING LINEAR INEQUALITIES**
  - 8.PAR.3.4: Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality.

Unit 7: Solving Equations

- **SOLVING LINEAR EQUATIONS**

- 8.PAR.3.3: Create and solve linear equations and inequalities in one variable within a relevant application.
- 8.PAR.3.6: Use algebraic reasoning to fluently manipulate linear and literal equations expressed in various forms to solve relevant, mathematical problems.
- 8.PAR.3.4: Using algebraic properties and the properties of real numbers, justify the steps of a one-solution equation or inequality.
- 8.PAR.3.2: Describe and solve linear equations in one variable with one solution (=), infinitely many solutions (=), or no solutions (=). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form = , = , or = results (where and are different numbers).
- 8.PAR.3.2: Describe and solve linear equations in one variable with one solution (=), infinitely many solutions (=), or no solutions (=). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form = , = , or = results (where and are different numbers).
- 8.PAR.3.2: Describe and solve linear equations in one variable with one solution (=), infinitely many solutions (=), or no solutions (=). Show which of these possibilities is the case by successively transforming the given equation into simpler forms, until an equivalent equation of the form = , = , or = results (where and are different numbers).

- **SOLVING SYSTEMS OF LINEAR EQUATIONS**
  - 8.FGR.7.3: Approximate solutions of two linear equations in two variables by graphing the equations and solving simple cases by inspection.
  - 8.FGR.7.2: Show and explain that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because the points of intersection satisfy both equations simultaneously.
  - 8.FGR.7.1: Interpret and solve relevant mathematical problems leading to two linear equations in two variables.
  - 8.FGR.7.4: Analyze and solve systems of two linear equations in two variables algebraically to find exact solutions.
- **SOLVING EQUATIONS USING ROOTS**
  - 8.NR.2.2: Use square root and cube root symbols to represent solutions to equations. Recognize that = (where is a positive rational number and 25) has two solutions and = (where is a negative or positive rational number and 10) has one solution. Evaluate square roots of perfect squares 625 and cube roots of perfect cubes 1000 and 1000.

Unit 8: The Pythagorean Theorem and Distance Formula

- **THE PYTHAGOREAN THEOREM**
  - 8.GSR.8.1: Explain a proof of the Pythagorean Theorem and its converse using visual models.

- 8.GSR.8.2: Apply the Pythagorean Theorem to determine unknown side lengths in right triangles within authentic, mathematical problems in two and three dimensions.

- **THE CONVERSE OF THE PYTHAGOREAN THEOREM**
  - 8.GSR.8.1: Explain a proof of the Pythagorean Theorem and its converse using visual models.
- **DISTANCE ON THE COORDINATE PLANE**
  - 8.GSR.8.3: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system in practical, mathematical problems.

Unit 9: Three-Dimensional Geometry

- **VOLUME OF CYLINDERS AND CONES**
  - 8.GSR.8.4: Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve in relevant problems.
- **SPHERES**
  - 8.GSR.8.4: Apply the formulas for the volume of cones, cylinders, and spheres and use them to solve in relevant problems.

Unit 10: Probability and Statistics

- **SCATTERPLOTS**
  - 8.FGR.6.1: Show that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, visually fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line of best fit.
- **LINEAR MODELS IN DATA**
  - 8.FGR.6.1: Show that straight lines are widely used to model relationships between two quantitative variables. For scatter plots that suggest a linear association, visually fit a straight line, and informally assess the model fit by judging the closeness of the data points to the line of best fit.
  - 8.FGR.6.2: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts.
  - 8.FGR.6.4: Use appropriate graphical displays from data distributions involving lines of best fit to draw informal inferences and answer the statistical investigative question posed in an unbiased statistical study.
  - 8.FGR.6.3: Explain the meaning of the predicted slope (rate of change) and the predicted intercept (constant term) of a linear model in the context of the data.