Tennessee Tutorials are designed specifically for the Tennessee Academic Standards to prepare students for the Tennessee Comprehensive Assessment Program (TCAP) and the TNReady assessments.

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.NS.A.1: Know that real numbers that are not rational are called irrational (e.g., , 2, etc.). Understand informally that every number has a decimal expansion; for rational numbers show that the decimal expansion repeats eventually or terminates, and convert a decimal expansion which repeats eventually or terminates into a rational number.
- **APPROXIMATING IRRATIONAL NUMBERS**
  - 8.NS.A.2: Use rational approximations of irrational numbers to compare the size of irrational numbers by locating them approximately on a number line diagram. Estimate the value of irrational expressions (such as).

Unit 2: Exponents

- **PROPERTIES OF EXPONENTS**
  - 8.EE.A.1: Know and apply the properties of integer exponents to generate equivalent numerical expressions.
- **POWERS OF 10**

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- 8.EE.A.3: Use numbers expressed in the form of a single digit times an integer power of 10 to estimate very large or very small quantities and to express how many times as much one is than the other.

- **SCIENTIFIC NOTATION**
  - 8.EE.A.4: Using technology, solve real-world problems with numbers expressed in decimal and scientific notation. Use scientific notation and choose units of appropriate size for measurements of very large or very small quantities (e.g., use millimeters per year for seafloor spreading).

Unit 3: Proportional Reasoning and Slope

- **SLOPE**
  - 8.EE.B.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
  - 8.EE.B.6: Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane; know and apply the equation = for a line through the origin and the equation = + for a line intercepting the vertical axis at .
- **MULTIPLE REPRESENTATIONS OF PROPORTIONS**
  - 8.EE.B.6: Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane; know and apply the equation = for a line through the origin and the equation = + for a line intercepting the vertical axis at .
  - 8.EE.B.5: Graph proportional relationships, interpreting the unit rate as the slope of the graph. Compare two different proportional relationships represented in different ways.
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Unit 4: Functions

- **FUNCTIONS AND RELATIONS**
  - 8.F.A.1: Understand that a function is a rule that assigns to each input exactly one output. The graph of a function is the set of ordered pairs consisting of an input and the corresponding output.
- **COMPARING FUNCTIONS**
  - 8.F.A.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).
  - 8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.
- **GRAPHS OF FUNCTIONS**
  - 8.F.B.5: Describe qualitatively the functional relationship between two quantities by analyzing a graph (e.g., where the function is increasing or decreasing, linear or nonlinear). Sketch a graph that exhibits the qualitative features of a function that has been described verbally.

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- 8.F.A.2: Compare properties of two functions each represented in a different way (algebraically, graphically, numerically in tables, or by verbal descriptions).

Unit 5: Representations of Linear Functions

- **SLOPE-INTERCEPT FORM**
  - 8.F.A.3: Know and interpret the equation = + as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
  - 8.EE.B.6: Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane; know and apply the equation = for a line through the origin and the equation = + for a line intercepting the vertical axis at .
  - 8.F.A.3: Know and interpret the equation = + as defining a linear function, whose graph is a straight line; give examples of functions that are not linear.
  - 8.EE.B.6: Use similar triangles to explain why the slope is the same between any two distinct points on a non-vertical line in the coordinate plane; know and apply the equation = for a line through the origin and the equation = + for a line intercepting the vertical axis at .
- **WRITING LINEAR FUNCTIONS**
  - 8.F.B.4: 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. Interpret 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.
- **GRAPHS OF LINEAR INEQUALITIES**
  - 8.EE.C.9: By graphing on the coordinate plane or by analyzing a given graph, determine the solution set of a linear inequality in one or two variables.

Unit 6: Solving Equations

- **SOLVING LINEAR EQUATIONS**
  - 8.EE.C.7b: Solve linear equations in one variable. Solve linear equations with rational number coefficients, including equations whose solutions require expanding expressions using the distributive property and combining like terms.
  - 8.EE.C.7a: Solve linear equations in one variable. Give examples of 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.EE.C.7a: Solve linear equations in one variable. Give examples of 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**

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- 8.EE.C.8a: Analyze and solve systems of two linear equations graphically. Understand that solutions to a system of two linear equations in two variables correspond to points of intersection of their graphs, because points of intersection satisfy both equations simultaneously.
- 8.EE.C.8b: Analyze and solve systems of two linear equations graphically. Estimate solutions by graphing a system of two linear equations in two variables. Identify solutions by inspecting graphs of a system of linear equations in two variables.

- **SOLVING EQUATIONS USING ROOTS**
  - 8.EE.A.2: Use square root and cube root symbols to represent solutions to equations of the form = and = , where is a positive rational number. Evaluate square roots of small perfect squares and cube roots of small perfect cubes.

Unit 7: The Pythagorean Theorem and Distance Formula

- **THE PYTHAGOREAN THEOREM**
  - 8.G.B.3: Explain a model of the Pythagorean Theorem and its converse.
  - 8.G.B.4: Know and apply the Pythagorean Theorem to determine unknown side lengths in right triangles in real-world and mathematical problems in two and three dimensions.
- **THE CONVERSE OF THE PYTHAGOREAN THEOREM**
  - 8.G.B.3: Explain a model of the Pythagorean Theorem and its converse.
- **DISTANCE ON THE COORDINATE PLANE**
  - 8.G.B.5: Apply the Pythagorean Theorem to find the distance between two points in a coordinate system.

Unit 8: Three-Dimensional Geometry

- **VOLUME OF CYLINDERS AND CONES**
  - 8.G.C.6: Apply the formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.
- **SPHERES**
  - 8.G.C.6: Apply the formulas for the volumes of cones, cylinders, and spheres to solve real-world and mathematical problems.

Unit 9: Transformations

- **BASICS OF TRANSFORMATIONS**
  - 8.G.A.1a: Describe the effect of translations, rotations, reflections, and dilations on two-dimensional figures using coordinates. Verify informally that lines are taken to lines, and determine when line segments are taken to line segments of the same length.
  - 8.G.A.1c: Describe the effect of translations, rotations, reflections, and dilations on two-dimensional figures using coordinates. Verify informally that parallel lines are taken to parallel lines.
- **TRANSFORMATIONS ON THE COORDINATE PLANE**

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- 8.G.A.1d: Describe the effect of translations, rotations, reflections, and dilations on two-dimensional figures using coordinates. Make connections between dilations and scale factors.

Unit 10: Angle Relationships

- **PARALLEL LINES AND ANGLE RELATIONSHIPS**
  - 8.G.A.2: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.
- **ANGLE RELATIONSHIPS IN TRIANGLES**
  - 8.G.A.2: Use informal arguments to establish facts about the angle sum and exterior angle of triangles, about the angles created when parallel lines are cut by a transversal, and the angle-angle criterion for similarity of triangles.

Unit 11: Data and Statistics

- **SCATTERPLOTS**
  - 8.SP.A.1: Construct and interpret scatter plots for bivariate measurement data to investigate patterns of association between two quantities. Describe patterns such as clustering, outliers, positive or negative association, linear association, and nonlinear association.
  - 8.SP.A.2: Know that straight lines are widely used to model linear relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.
- **LINEAR MODELS IN DATA**
  - 8.SP.A.2: Know that straight lines are widely used to model linear relationships between two quantitative variables. For scatter plots that suggest a linear association, informally fit a straight line and informally assess the model fit by judging the closeness of the data points to the line.
  - 8.SP.A.3: Use the equation of a linear model to solve problems in the context of bivariate measurement data, interpreting the slope and intercepts.

Unit 12: Probability

- **PROBABILITY OF COMPOUND EVENTS**
  - 8.SP.B.4a: Find probabilities of and represent sample spaces for compound events using organized lists, tables, tree diagrams, and simulation. Understand that, just as with simple events, the probability of a compound event is the fraction of outcomes in the sample space for which the compound event occurs.
  - 8.SP.B.4b: Find probabilities of and represent sample spaces for compound events using organized lists, tables, tree diagrams, and simulation. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., rolling double sixes), identify the outcomes in the sample space which compose the event.
- **SIMULATIONS**

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- 8.SP.B.4b: Find probabilities of and represent sample spaces for compound events using organized lists, tables, tree diagrams, and simulation. Represent sample spaces for compound events using methods such as organized lists, tables, and tree diagrams. For an event described in everyday language (e.g., rolling double sixes), identify the outcomes in the sample space which compose the event.

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