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: Points, Lines, and Angles 1

- **POINTS, RAYS, LINE SEGMENTS, LINES, AND FIGURES**
  - G.CO.C.8: Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.
- **PARALLEL AND PERPENDICULAR LINES**
  - G.CO.C.8: Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.2: Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.

Unit 2: Points, Lines, and Angles 2

- **PARALLEL LINES AND ANGLE RELATIONSHIPS**
  - G.CO.C.8: Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.
- **PERPENDICULAR BISECTOR AND ANGLE BISECTOR THEOREMS**

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- G.CO.C.8: Use definitions and theorems about lines and angles to solve problems and to justify relationships in geometric figures.

Unit 3: Coordinate Geometry

- **LENGTH AND THE DISTANCE FORMULA**
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.3: Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.
- **MIDPOINT FORMULA ON THE COORDINATE PLANE**
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.2: Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.
- **CONJECTURES IN COORDINATE GEOMETRY**
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.2: Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.
  - G.GPE.A.3: Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.

Unit 4: Perimeter and Area on the Coordinate Plane

- **PERIMETER ON THE COORDINATE PLANE**
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.2: Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.
  - G.GPE.A.3: Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.
- **AREA ON THE COORDINATE PLANE**
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - G.GPE.A.1: Use coordinates to justify geometric relationships algebraically and to solve problems.
  - G.GPE.A.2: Use the slope criteria for parallel and perpendicular lines to solve problems and to justify relationships in geometric figures.
  - G.GPE.A.3: Understand the relationship between the Pythagorean Theorem and the distance formula and use an efficient method to solve problems on the coordinate plane.

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- G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.

Unit 5: Transformations on the Coordinate Plane

- **TRANSFORMATIONS ON THE COORDINATE PLANE**
  - G.CO.A.4: Given a geometric figure, draw the image of the figure after a sequence of one or more rigid motions, by hand and using technology. Identify a sequence of rigid motions that will carry a given figure onto another.
  - G.CO.B.6: Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
  - G.CO.B.5: Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.
  - G.CO.A.1: Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.
  - G.CO.A.3: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.
- **DILATIONS, TRANSLATIONS, ROTATIONS, AND REFLECTIONS**
  - G.CO.B.5: Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.
  - G.CO.A.1: Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.
  - G.CO.A.3: Develop definitions of rotations, reflections, and translations in terms of angles, circles, perpendicular lines, parallel lines, and line segments.

Unit 6: Congruence and Similarity of Triangles

- **TRIANGLES AND CONGRUENCE TRANSFORMATIONS**
  - G.CO.A.4: Given a geometric figure, draw the image of the figure after a sequence of one or more rigid motions, by hand and using technology. Identify a sequence of rigid motions that will carry a given figure onto another.
  - G.CO.A.1: Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.

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- G.SRT.B.3: Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.
- G.CO.B.6: Use the definition of congruence in terms of rigid motions to show that two triangles are congruent if and only if corresponding pairs of sides and corresponding pairs of angles are congruent.
- G.CO.B.5: Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.
- G.CO.B.7: Explain how the criteria for triangle congruence (ASA, SAS, AAS, SSS, and HL) follow from the definition of congruence in terms of rigid motions.

- **TRIANGLES AND SIMILARITY TRANSFORMATIONS**
  - G.SRT.A.2: Define similarity in terms of transformations. Use transformations to determine whether two figures are similar.
  - G.CO.A.1: Describe transformations as functions that take points in the plane (pre-image) as inputs and give other points (image) as outputs. Compare transformations that preserve distance and angle measure to those that do not, by hand for basic transformations and using technology for more complex cases.
  - G.SRT.B.3: Use congruence and similarity criteria for triangles to solve problems and to justify relationships in geometric figures.
  - G.SRT.A.1: Use properties of dilations given by a center and a scale factor to solve problems and to justify relationships in geometric figures.

Unit 7: Congruence and Similarity of Polygons

- **CONGRUENCE OF OTHER POLYGONS**
  - G.CO.A.2: Given a rectangle, parallelogram, trapezoid, or regular polygon, determine the transformations that carry the shape onto itself and describe them in terms of the symmetry of the figure.
  - G.CO.B.5: Given two figures, use the definition of congruence in terms of rigid motions to determine informally if they are congruent.
- **SIMILARITY OF OTHER POLYGONS**
  - G.SRT.A.2: Define similarity in terms of transformations. Use transformations to determine whether two figures are similar.
  - G.SRT.A.1: Use properties of dilations given by a center and a scale factor to solve problems and to justify relationships in geometric figures.

Unit 8: Triangles

- **TRIANGLE ANGLE THEOREMS**
  - G.CO.C.9: Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures.

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- **TRIANGLE BISECTORS**
  - G.CO.C.9: Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures.
  - G.CO.D.12: Use geometric constructions to solve geometric problems in context, by hand and using technology.
- **MEDIANS AND ALTITUDES OF TRIANGLES**
  - G.CO.C.9: Use definitions and theorems about triangles to solve problems and to justify relationships in geometric figures.

Unit 9: Quadrilaterals and Constructions

- **PARALLELOGRAMS AND RECTANGLES**
  - G.CO.C.10: Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures.
- **SQUARES AND RHOMBI**
  - G.CO.C.10: Use definitions and theorems about parallelograms to solve problems and to justify relationships in geometric figures.
- **CONSTRUCTIONS**
  - G.CO.D.11: Perform formal geometric constructions with a variety of tools and methods (compass and straightedge, string, reflective devices, paper folding, dynamic geometric software, etc.).
  - G.CO.D.12: Use geometric constructions to solve geometric problems in context, by hand and using technology.

Unit 10: Right Triangles

- **PYTHAGOREAN THEOREM**
  - G.SRT.C.5a: Solve triangles. Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context.
- **PROBLEM SOLVING WITH RIGHT TRIANGLES**
  - G.SRT.C.4a: Use side ratios in right triangles to define trigonometric ratios. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
  - G.SRT.C.5a: Solve triangles. Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context.
- **SPECIAL RIGHT TRIANGLES**
  - G.SRT.C.5b: Solve triangles. Know and use relationships within special right triangles to solve problems in a real-world context.

Unit 11: Trigonometry

- **TRIGONOMETRIC RATIOS**

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- G.SRT.C.4a: Use side ratios in right triangles to define trigonometric ratios. Understand that by similarity, side ratios in right triangles are properties of the angles in the triangle, leading to definitions of trigonometric ratios for acute angles.
- G.SRT.C.4b: Use side ratios in right triangles to define trigonometric ratios. Explain and use the relationship between the sine and cosine of complementary angles.
- G.SRT.C.5a: Solve triangles. Know and use the Pythagorean Theorem and trigonometric ratios (sine, cosine, tangent, and their inverses) to solve right triangles in a real-world context.

- **LAWS OF SINE AND COSINE**
  - G.SRT.C.5c: Solve triangles. Use the Law of Sines and Law of Cosines to solve non-right triangles in a real-world context.

Unit 12: Circle Measurement

- **MONITORING PRECISION AND ACCURACY**
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.N.Q.A.1c: Use units as a way to understand real-world problems. Choose an appropriate level of accuracy when reporting quantities.
- **AREA OF CIRCLES AND SECTORS**
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.C.A.1: Use proportional relationships between the area of a circle and the area of a sector within the circle to solve problems in a real-world context.
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.

Unit 13: Volume 1

- **VOLUME OF PRISMS AND PYRAMIDS**
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.GMD.A.2: Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.
- **VOLUME OF CYLINDERS AND CONES**
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.

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- G.GMD.A.2: Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.
- G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.
- G.GMD.A.1: Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid.

Unit 14: Volume 2

- **SURFACE AREA AND VOLUME OF SPHERES**
  - G.GMD.A.2: Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.
- **MODELING SITUATIONS WITH GEOMETRY**
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.

Unit 15: Composite Shapes

- **SURFACE AREA OF COMPOSITE SOLIDS**
  - G.N.Q.A.1b: Use units as a way to understand real-world problems. Define and justify appropriate quantities within a context for the purpose of modeling.
  - G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
  - G.GMD.A.2: Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.
  - G.GMD.A.1: Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid.
  - G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.
- **VOLUME OF COMPOSITE SOLIDS**

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- G.MG.A.1: Use geometric shapes, their measures, and their properties to model objects found in a real-world context for the purpose of approximating solutions to problems.
- G.N.Q.A.1a: Use units as a way to understand real-world problems. Use appropriate quantities in formulas, converting units as necessary.
- G.GMD.A.2: Use volume and surface area formulas for cylinders, cones, prisms, pyramids, and spheres to solve problems in a real-world context.
- G.GMD.A.1: Understand and explain the formulas for the volume and surface area of a cylinder, cone, prism, and pyramid.

Unit 16: Probability

- **INTRODUCTION TO PROBABILITY**
  - G.S.CP.A.1a: Use set notation to represent contextual situations. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (or, and, not).
  - G.S.CP.B.3a: Understand and apply the Addition Rule. Explain the Addition Rule, (or) = () + () (and) in terms of visual models (Venn diagrams, frequency tables, etc.).
  - G.S.CP.B.3b: Understand and apply the Addition Rule. Apply the Addition Rule to solve problems and interpret the answer in terms of the given context.
  - G.S.CP.A.1b: Use set notation to represent contextual situations. Flexibly move between visual models (Venn diagrams, frequency tables, etc.) and set notation.
- **GEOMETRIC PROBABILITIES**
  - G.S.CP.C.4: Calculate probabilities using geometric figures.
- **CONDITIONAL PROBABILITY**
  - G.S.CP.B.2: Find the conditional probability of given as the fraction of s outcomes that also belong to and interpret the answer in terms of the given context.
  - G.S.CP.A.1a: Use set notation to represent contextual situations. Describe events as subsets of a sample space (the set of outcomes) using characteristics (or categories) of the outcomes, or as unions, intersections, or complements of other events (or, and, not).

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