

| TN DOE unique identifier | SPI | ACT content area | Range | <u>ACT College Readiness Standard</u> | NAEP content area | Grade | <u>NAEP 2009 Math Content Area Standard</u> |
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| Geometry | | | | | | | |
| Geometry SPI 3108.1.1 | Give precise mathematical descriptions or definitions of geometric shapes in the plane and space. | | | | GEO | 12 | 1c) Give precise mathematical descriptions or definitions of geometric shapes in the plane and in three-dimensional space. |
| Geometry SPI 3108.1.2 | Determine areas of planar figures by decomposing them into simpler figures without a grid. | MEAS | 33-36 | Compute the area of composite geometric figures when planning or visualization is required | MEAS | 8 12 | 1f) Solve mathematical or real-world problems involving perimeter or area of plane figures such as triangles, rectangles, circles, or composite figures 1f) Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures. |
| Geometry SPI 3108.1.3 | Use geometric understanding and spatial visualization of geometric solids to solve problems and/or create drawings. | | | | GEO | 8 | 1f) Demonstrate an understanding about the two- and three-dimensional shapes in our world through identifying, drawing, modeling, building, or taking apart. |
| Geometry SPI 3108.1.4 | Use definitions, basic postulates, and theorems about points, lines, angles, and planes to write/complete proofs and/or to solve problems. | PPF | 33-36 | Draw conclusions based on a set of conditions | GEO | 12 | 5a) Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines. 5b) Describe the intersections of lines in the plane and in space, intersections of a line and a plane, or of two planes in space. 5c) Describe or identify conic sections and other cross sections of solids. |

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| Geometry SPI 3108.2.1 | Analyze, apply, or interpret the relationships between basic number concepts and geometry (e.g. rounding and pattern identification in measurement, the relationship of pi to other rational and irrational numbers) | | | | MEAS | 8 | 1e Select or use appropriate measurement instrument to determine or create a given length, area, volume, angle, weight, or mass.) |
| Geometry SPI 3108.2.2 | Perform operations on vectors in various representations. | | | | GEO | 12 | 4e) Use vectors to represent velocity and direction; multiply a vector by a scalar and add vectors both algebraically and graphically. |
| Geometry SPI 3108.3.1 | Use algebra and coordinate geometry to analyze and solve problems about geometric figures (including circles). | PPF | 33-36 | Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas | ALG GEO | 8 12 | 2d) Solve problems involving coordinate pairs on the rectangular coordinate system. 4a) Solve problems involving the coordinate plane such as the distance between two points, the midpoint of a segment, or slopes of perpendicular or parallel lines. 4f) Find an equation of a circle given its center and radius and, given an equation of a circle, find its center and radius. |
| Geometry SPI 3108.3.2 | Use coordinate geometry to prove characteristics of polygonal figures. | GR PPF | 33-36 33-36 | Analyze and draw conclusions based on information from graphs in the coordinate plane Solve multistep geometry problems that involve integrating concepts, planning, visualization, and/or making connections with other content areas | GEO | 8 | 4d) Represent geometric figures using rectangular coordinates on a plane. |
| Geometry SPI 3108.3.3 | Describe algebraically the effect of a single | | | | GEO | 12 | 2b) Give or recognize the precise mathematical relationship (e.g., congruence, |

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| | | | | | | | counterexamples. 5b) Determine the role of hypotheses, logical implications, and conclusion, in proofs of geometric theorems. 5c) Analyze or explain a geometric argument by contradiction |
| Geometry SPI 3108.4.5 | Describe solids and/or surfaces in three-dimensional space when given two-dimensional representations for the surfaces of three-dimensional objects. | | | | GEO | 8 | 1c) Identify, define, or describe geometric shapes in the plane and in three-dimensional space given a visual representation. 1e) Represent or describe a three-dimensional situation in a two-dimensional drawing from different views. |
| Geometry SPI 3108.4.6 | Use various area of triangle formulas to solve contextual problems (e.g., Heron's formula, the area formula for an equilateral triangle and $A = \frac{1}{2} ab \sin C$). | MEAS | 20-23 24-27 | Compute the area and perimeter of triangles and rectangles in simple problems Use geometric formulas when all necessary information is given Compute the area of triangles and rectangles when one or more additional simple steps are required | MEAS | 8 | 1f) Solve mathematical or real-world problems involving perimeter or area of plane figures such as triangles, rectangles, circles, or composite figures. |
| Geometry SPI 3108.4.7 | Compute the area and/or perimeter of triangles, quadrilaterals and other polygons when one or more additional steps are required (e.g. find missing dimensions given area or perimeter of the figure, using trigonometry). | MEAS | 24-27 33-36 | Compute the area of triangles and rectangles when one or more additional simple steps are required Compute the perimeter of simple composite geometric figures with unknown side lengths Compute the area of composite geometric figures when planning or visualization is required | MEAS | 12 | 1f) Solve problems involving perimeter or area of plane figures such as polygons, circles, or composite figures. |

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| Geometry SPI 3108.4.11 | Use basic theorems about similar and congruent triangles to solve problems. | PPF | 28-32 | Apply properties of 30°-60°-90°, 45°-45°-90°, similar, and congruent triangles | GEO | 12 | 2e) Justify relationships of congruence and similarity, and apply these relationships using scaling and proportional reasoning. |
| Geometry SPI 3108.4.12 | Solve problems involving congruence, similarity, proportional reasoning and/or scale factor of two similar figures or solids | MEAS | 13-15 28-32 33-36 | Estimate or calculate the length of a line segment based on other lengths given on a geometric figure Use relationships involving area, perimeter, and volume of geometric figures to compute another measure Use scale factors to determine the magnitude of a size change | GEO | 12 | 2e) Justify relationships of congruence and similarity, and apply these relationships using scaling and proportional reasoning. |
| Geometry SPI 3108.4.13 | Identify, analyze and/or use basic properties and theorems of circles to solve problems (including those relating right triangles and circles). | PPF | 33-36 | Use relationships among angles, arcs, and distances in a circle | GEO | 12 | 3h) Analyze properties of circles and the intersections of lines and circles (inscribed angles, central angles, tangents, secants, chords). 5e) Prove basic theorems about congruent and similar triangles and circles. |
| Geometry SPI 3108.4.14 | Use properties of right triangles to solve problems (such as involving the relationship formed when the altitude to the hypotenuse of a right triangle is drawn). | FN | 28-32 | Apply basic trigonometric ratios to solve right-triangle problems | GEO | 12 | 3e) Recall and interpret definitions and basic properties of congruent and similar triangles, circles, quadrilaterals, polygons, parallel, perpendicular and intersecting lines, and associated angle relationships. |
| Geometry SPI 3108.4.15 | Determine and use the appropriate | FN | 28-32 | Apply basic trigonometric ratios to solve right-triangle problems | MEAS | 12 | 3b) Solve problems using the fact that trigonometric ratios (sine, cosine, and tangent) |

