Geometry Proficiency Level Descriptors

Minimal

Students performing at the minimal level are beginning to apply their geometric mathematics skills. They are learning to use the language and operations of algebra and coordinate geometry to find slopes, lengths, midpoints, classify geometric figures, and determine if points are collinear. Students recognize and attempt to use formulas for area, perimeter, surface area, and volume. They recognize characteristics of polygons and circles, but not the relationships between their parts. Students identify sine, cosine and tangent ratios and attempt to use special right triangle properties. They have difficulty using inductive and deductive reasoning to make conjectures, or write conditional statements, converses, and inverses. They have difficulty reasoning through and creating proofs of the congruency and similarity of triangles, the Pythagorean Theorem, and theorems involving isosceles triangles. They are developing how to recognize and classify relationships of angle pairs, perpendicular lines, and parallel lines. They are learning to describe symmetry but do not see relationships in parts of two-and three-dimensional figures. Students have difficulty solving problems using the Pythagorean Theorem, the distance formula, trigonometric ratios, and geometric probability.

Partial

Students performing at the partial level inconsistently apply their geometric mathematics skills. They have difficulty using coordinate geometry to find slopes, lengths, midpoints, classify geometric figures, determine if points are collinear, and write equations of lines and circles. Students have difficulty identifying and using formulas for area, perimeter, surface area, and volume. They define characteristics of polygons and circles, and are beginning to derive, justify, and use formulas, and show relationships between their parts. Students are beginning to identify and use sine, cosine, and tangent ratios (including their inverses), and special right triangles to solve problems. Students may be able to use inductive and deductive reasoning to make conjectures and develop conditional statements, converses, and inverses, and determine truth values of these statements. They create incomplete proofs of the congruency and similarity of triangles, the Pythagorean Theorem, and theorems involving isosceles triangles. Students recognize and classify some properties and relationships of angle pairs, perpendicular lines, and parallel lines. They describe symmetry and basic relationships in parts of two-and three-dimensional figures. They inconsistently solve problems using the Pythagorean Theorem, the distance formula, trigonometric ratios, and geometric probability.

Geometry Proficiency Level Descriptors

Sufficient

Students performing at the sufficient level apply geometric mathematics skills appropriately. They use the language and operations of algebra and coordinate geometry to find slopes, lengths, midpoints, classify geometric figures, determine if points are collinear, and write equations of lines and circles. Students use formulas for area, perimeter, surface area, and volume. They define and analyze characteristics of polygons and circles to derive, justify, and use formulas, and show relationships between their parts. Students identify and use sine, cosine, and tangent ratios and their inverses, and special right triangles to solve problems. Students use inductive and deductive reasoning to develop mathematical arguments and prove geometric conjectures and theorems regarding triangles and quadrilaterals including the congruency and similarity of triangles, the Pythagorean Theorem, and theorems involving isosceles triangles. Students classify and prove properties of angles and relationships between angle pairs, perpendicular lines, and parallel lines. They describe symmetry and relationships in parts of two-and three-dimensional figures. They solve real-world problems using visualization and spatial reasoning including the Pythagorean Theorem, the distance formula, trigonometric ratios, and geometric probability.

Substantial

Students performing at the substantial level consistently apply geometric mathematics skills appropriately. They use the language and operations of algebra and coordinate geometry to find slopes, lengths, midpoints, classify geometric figures, determine if points are collinear, and write equations of lines and circles. Students apply formulas for area, perimeter, surface area, and volume to real-life situations. They clearly show relationships, describe and analyze characteristics of polygons and circles to derive, justify, and use formulas. Students consistently use sine, cosine, and tangent ratios (including their inverses), and special right triangles to solve problems. Students distinguish between inductive and deductive reasoning when developing conditional statements, converses, and inverses, and determining truth values and making inferences from these statements. They are able to use multiple approaches to prove geometric relationships including the congruency and similarity of triangles, the Pythagorean Theorem, and theorems involving isosceles triangles. They apply and prove properties of angles and relationships in angle pairs, perpendicular lines, and parallel lines. Students use symmetry and relationships in parts of two- and three-dimensional figures to solve problems. They confidently solve real-world problems using visualization and spatial reasoning including the Pythagorean Theorem, the distance formula, trigonometric ratios, and geometric probability.