

New Jersey High School Geometry  
Geometry and Measurement

Description	Boardworks High School Geometry presentations
4.2.12 A. Geometric Properties	
1 Use geometric models to represent real-world situations and objects and to solve problems using those models (e.g., use Pythagorean Theorem to decide whether an object can fit through a doorway).	Finding the length of diagonals using the Pythagorean Theorem Finding the height of triangles using the Pythagorean Theorem Using the Pythagorean Theorem to solve problems in context Finding the distance between two points using the Pythagorean Theorem Finding the diagonal in a rectangular prism Applying trigonometry
2 Draw perspective views of 3D objects on isometric dot paper, given 2D representations (e.g., nets or projective views).	Reflection symmetry in 3-D shapes Rotational symmetry in 3-D shapes Prisms Pyramids Cylinders, cones and spheres
3 Apply the properties of geometric shapes.	
Parallel lines – transversal, alternate interior angles, corresponding angles	Lines Angles Using angles Parallel and perpendicular lines
Triangles	
3a Conditions for congruence	Congruence and similarity Using congruence and similarity Dilation
3b Segment joining midpoints of two sides is parallel to and half the length of the third side	–
3c Triangle Inequality	The Triangle Inequality Theorem
3d Special right triangles	Special right triangles
Minimal conditions for a shape to be a special quadrilateral	Quadrilaterals
Circles – arcs, central and inscribed angles, chords, tangents	Parts of a circle Angles in a circle The length of an arc

Self-similarity	Congruence and similarity Using congruence and similarity Similar right triangles
4 Use reasoning and some form of proof to verify or refute conjectures and theorems.	
Verification or refutation of proposed proofs	–
Simple proofs involving congruent triangles	Congruence and similarity Using congruence and similarity Dilation
Counterexamples to incorrect conjectures	–
Perform basic geometric constructions using a variety of methods (e.g., straightedge and compass, patty/tracing paper, or technology).	Constructing triangles Constructing bisecting lines and angles Using construction
Perpendicular bisector of a line segment	Constructing bisecting lines and angles
Bisector of an angle	Constructing bisecting lines and angles
Perpendicular or parallel lines	Constructing bisecting lines and angles Parallel and perpendicular lines
4.2.12 B. Transforming Shapes	
1 Determine, describe, and draw the effect of a transformation, or a sequence of transformations, on a geometric or algebraic representation, and, conversely, determine whether and how one representation can be transformed to another by a transformation or a sequence of transformations.	Reflection symmetry Rotational symmetry Reflection and rotational symmetry Reflection symmetry in 3-D shapes Rotational symmetry in 3-D shapes Translation Rotation Combining transformations
2 Recognize three-dimensional figures obtained through transformations of two-dimensional figures (e.g., cone as rotating an isosceles triangle about an altitude), using software as an aid to visualization.	Reflection symmetry in 3-D shapes Rotational symmetry in 3-D shapes
3 Determine whether two or more given shapes can be used to generate a tessellation.	Tessellation
4 Generate and analyze iterative geometric patterns.	
Fractals (e.g., Sierpinski's Triangle)	–
Patterns in areas and perimeters of self-similar figures	–
Outcome of extending iterative process indefinitely	–
4.2.12 C. Coordinate Geometry	

1 Use coordinate geometry to represent and verify properties of lines and line segments.	
Distance between two points	The distance between two points
Midpoint and slope of a line segment	The midpoint of a line segment
Finding the intersection of two lines	–
Lines with the same slope are parallel	Parallel and perpendicular lines
Lines that are perpendicular have slopes whose product is $-1$	Parallel and perpendicular lines
2 Show position and represent motion in the coordinate plane using vectors.	
Addition and subtraction of vectors	Vectors Adding and subtracting vectors
3 Find an equation of a circle given its center and radius and, given an equation of a circle in standard form, find its center and radius.	The equation of a circle
4.2.12 D. Units of Measurement	
1 Understand and use the concept of significant digits.	–
2 Choose appropriate tools and techniques to achieve the specified degree of precision and error needed in a situation.	
Degree of accuracy of a given measurement tool	Continuous measurements Calculations involving bounds
Finding the interval in which a computed measure (e.g., area or volume) lies, given the degree of precision of linear measurements	Ratios
4.2.12 E. Measuring Geometric Objects	
1 Use techniques of indirect measurement to represent and solve problems.	
Similar triangles	Congruence and similarity Similar right triangles

Pythagorean theorem	<p>The Pythagorean Theorem  Identifying right triangles  Pythagorean triples  Similar right triangles  Calculating sides of a triangle  Finding the length of diagonals using the Pythagorean Theorem  Finding the height of triangles using the Pythagorean Theorem  Using the Pythagorean Theorem to solve problems in context  Finding the distance between two points using the Pythagorean Theorem  Finding the diagonal in a rectangular prism</p>
Right triangle trigonometry (sine, cosine, tangent)	<p>Right triangles  The sine ratio  The cosine ratio  The tangent ratio  Trigonometry summary  Opposite and adjacent sides  The sine, cosine and tangent of any angle  Trig value functions on the unit circle  Sin, cos and tan of 30, 45 and 60  Applying trigonometry  Inverses in trigonometry</p>
2 Use a variety of strategies to determine perimeter and area of plane figures and surface area and volume of 3D figures.	
Approximation of area using grids of different sizes	Area formulas and calculations

<p>Finding which shape has minimal (or maximal) area, perimeter, volume, or surface area under given conditions using graphing calculators, dynamic geometric software, and/or spreadsheets</p>	<p>Area formulas and calculations  Using area formulas  Radius and circumference  The area of a circle  The length of an arc  The area of a sector  Edges of rectangular prisms  Prisms  Pyramids  Cylinders, cones and spheres  Using length, area and volume formulas  Surface area of rectangular prisms  Volume of right rectangular prisms  Triangles  Quadrilaterals  Polygons</p>
<p>Estimation of area, perimeter, volume, and surface area</p>	<p>Area formulas and calculations  Using area formulas  Radius and circumference  The area of a circle  The length of an arc  The area of a sector  Edges of rectangular prisms  Prisms  Pyramids  Cylinders, cones and spheres  Using length, area and volume formulas  Surface area of rrectangular prisms  Volume of right rectangular prisms  Triangles  Quadrilaterals  Polygons</p>