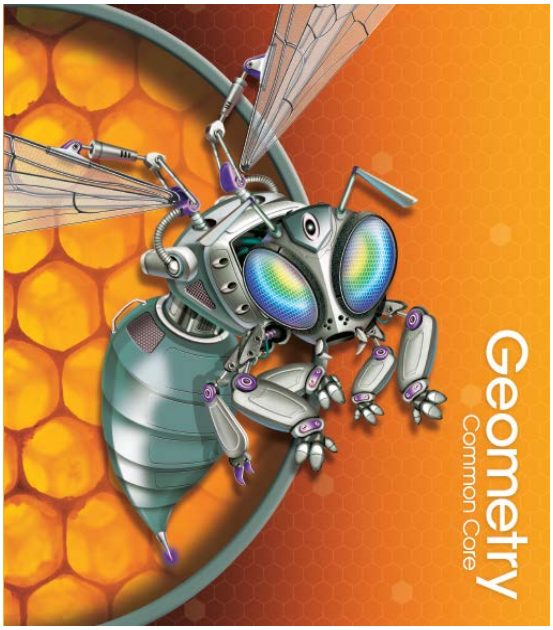
An Alignment of

Minnesota Academic Standards for Mathematics 2007

Minnesota Department of Education

To the Lessons of

Pearson High School Mathematics Geometry Common Core



ALWAYS LEARNING PEARSON

An Alignment of the Minnesota Academic Standards for Mathematics 2007 to *Pearson High School Mathematics – Geometry Common Core*

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An Alignment of the Minnesota Academic Standards for Mathematics 2007 to *Pearson High School Mathematics – Geometry Common Core*

Pearson High School Mathematics Common Core Geometry, ©2015	**Minnesota Mathematics K-12 Academic Standards**
Chapter 1	
1-1: Nets and Drawings for Visualizing Geometry	**6.3.1.1** Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models. **5.3.1.2** Recognize and draw a net for a three-dimensional figure.
1-2: Points, Lines, and Planes	**9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **8.3.2.3** Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically. **7.3.2.4** Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices of the figure after the transformation. **6.3.2.1** Solve problems using the relationships between the angles formed by intersecting lines. **5.3.1.2** Recognize and draw a net for a three-dimensional figure. **3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.

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1-3: Measuring Segments	**9.3.4.4** Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments. **2.3.2.2** Demonstrate an understanding of the relationship between length and the numbers on a ruler by using a ruler to measure lengths to the nearest centimeter or inch.
1-4: Measuring Angles	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results. **6.3.2.1** Solve problems using the relationships between the angles formed by intersecting lines **4.3.2.1** Measure angles in geometric figures and real-world objects with a protractor or angle ruler. **4.3.2.2** Compare angles according to size. Classify angles as acute, right and obtuse.
1-5: Exploring Angle Pairs	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.

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(Continued) 1-5: Exploring Angle Pairs	**6.3.2.1** Solve problems using the relationships between the angles formed by intersecting lines.
1-6: Basic Constructions	**9.3.2.5** Use technology tools to examine theorems, make and test conjectures, perform constructions and develop mathematical reasoning skills in multi-step problems. The tools may include compass and straight edge, dynamic geometry software, design software or Internet applets.
1-7: Midpoint and Distance in the Coordinate Plane	**9.3.4.4** Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments. **8.3.1.2** Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system.
1-8: Perimeter, Circumference, and Area	**9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **7.3.1.1** Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π. Calculate the circumference and area of circles and sectors of circles to solve problems in various contexts. **6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.

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(Continued) 1-8: Perimeter, Circumference, and Area	**6.3.1.3** Estimate the perimeter and area of irregular figures on a grid when they cannot be decomposed into common figures and use correct units, such as cm and cm^2.
Chapter 2	
2-1: Patterns and Inductive Reasoning	**9.4.1.3** Use scatterplots to analyze patterns and describe relationships between two variables. Using technology, determine regression lines (line of best fit) and correlation coefficients; use regression lines to make predictions and correlation coefficients to assess the reliability of those predictions. **6.2.1** Recognize and represent relationships between varying quantities; translate from one representation to another; use patterns, tables, graphs and rules to solve real-world and mathematical problems. **5.2.1.1** Create and use rules, tables, spreadsheets and graphs to describe patterns of change and solve problems. **4.2.1.1** Identify a pattern that is consistent [with these figures], create an input-output rule that describes the pattern, and use the rule to find the number of dots in the 10th figure. **2.2.1.1** Identify, create and describe simple number patterns involving repeated addition or subtraction, skip counting and arrays of objects such as counters or tiles. Use patterns to solve problems in various contexts. **1.2.1.1** Create simple patterns using objects, pictures, numbers and rules. Identify possible rules to complete or extend patterns. Patterns may be repeating, growing or shrinking. Calculators can be used to create and explore patterns.

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(Continued) 2-1: Patterns and Inductive Reasoning	**K.2.1.1** Identify, create, complete, and extend simple patterns using shape, color, size, number, sounds and movements. Patterns may be repeating, growing or shrinking such as ABB, ABB, ABB or ●,●●,●●●.
2-2: Conditional Statements	**9.3.2.2** Accurately interpret and use words and phrases such as "if…then," "if and only if," "all," and "not." Recognize the logical relationships between an "if…then" statement and its inverse, converse and contrapositive.
2-3: Biconditionals and Definitions	**9.3.2.1** Understand the roles of axioms, definitions, undefined terms and theorems in logical arguments. **9.3.2.2** Accurately interpret and use words and phrases such as "if…then," "if and only if," "all," and "not." Recognize the logical relationships between an "if…then" statement and its inverse, converse and contrapositive.
2-4: Deductive Reasoning	**9.3.2.4** Construct logical arguments and write proofs of theorems and other results in geometry, including proofs by contradiction. Express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts or illustrations. **9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.

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(Continued) 2-4: Deductive Reasoning	**9.3.3.3** Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results. **9.3.3.5** Know and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems and logically justify results. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **9.3.3.8** Know and apply properties of a circle to solve problems and logically justify results.
2-5: Reasoning in Algebra and Geometry	**9.3.4.7** Use algebra to solve geometric problems unrelated to coordinate geometry, such as solving for an unknown length in a figure involving similar triangles, or using the Pythagorean Theorem to obtain a quadratic equation for a length in a geometric figure.
2-6: Proving Angles Congruent	**9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
Chapter 3	
3-1: Lines and Angles	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **6.3.2.1** Solve problems using the relationships between the angles formed by intersecting lines.

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3-2: Properties of Parallel Lines	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
3-3: Proving Lines Parallel	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
3-4: Parallel and Perpendicular Lines	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
3-5: Parallel Lines and Triangles	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.

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(Continued) 3-5: Parallel Lines and Triangles	**6.3.2.2** Determine missing angle measures in a triangle using the fact that the sum of the interior angles of a triangle is 180°. Use models of triangles to illustrate this fact.
3-6: Constructing Parallel and Perpendicular Lines	**9.3.2.5** Use technology tools to examine theorems, make and test conjectures, perform constructions and develop mathematical reasoning skills in multi-step problems. The tools may include compass and straight edge, dynamic geometry software, design software or Internet applets. **9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. **9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.
3-7: Equations of Lines in the Coordinate Plane	**8.2.1.3** Understand that a function is linear if it can be expressed in the form f (x) = mx + b or if its graph is a straight line. **8.2.2.2** Identify how coefficient changes in the equation f (x) = mx + b affect the graphs of linear functions. Know how to use graphing technology to examine these effects. **8.2.4.3** Express linear equations in slope-intercept, point-slope and standard forms, and convert between these forms. Given sufficient information, find an equation of a line.
3-8: Slopes of Parallel and Perpendicular Lines	**9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.

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(Continued) 3-8: Slopes of Parallel and Perpendicular Lines	**9.3.4.4** Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments. **8.3.2.1** Understand and apply the relationships between the slopes of parallel lines and between the slopes of perpendicular lines. Dynamic graphing software may be used to examine these relationships. **8.3.2.3** Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically.
Chapter 4	
4-1: Congruent Figures	**9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.
4-2: Triangle Congruence by SSS and SAS	The Minnesota standards do not refer specifically to the triangle congruence postulate and theorems (SAS, SSS, ASA, AAS). **9.3.3** Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.

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4-3: Triangle Congruence by ASA and AAS	The Minnesota standards do not refer specifically to the triangle congruence postulate and theorems (SAS, SSS, ASA, AAS). **9.3.3** Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.
4-4: Using Corresponding Parts of Congruent Triangles	**9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results.
4-5: Isosceles and Equilateral Triangles	**9.3.3.3** Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.
4-6: Congruence in Right Triangles	**9.3.3** Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry. **9.3.3.4** Apply the Pythagorean Theorem and its converse to solve problems and logically justify results. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results.

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4-7: Congruence in Overlapping Triangles	**9.3.3** Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results.
Chapter 5	
5-1: Midsegments of a Triangle	The Minnesota standards do not refer specifically to the midsegments or midlines of triangles. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. For example: Analyze lengths and areas in a figure formed by drawing a line segment from one side of a triangle to a second side, parallel to the third side.
5-2 Perpendicular and Angle Bisectors	The Minnesota standards do not refer specifically to angle bisectors. **9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. For example: Prove that the perpendicular bisector of a line segment is the set of all points equidistant from the two endpoints, and use this fact to solve problems and justify other results.

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5-3 Bisectors in Triangles	The Minnesota standards do not refer specifically to bisectors of angles or sides in triangles. **9.3.3.1** Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results. For example: Prove that the perpendicular bisector of a line segment is the set of all points equidistant from the two endpoints, and use this fact to solve problems and justify other results. **9.3.3.3** Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.
5-4: Medians and Altitudes	The Minnesota standards do not refer specifically to medians or altitudes in triangles. **9.3.3.3** Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.
5-5: Indirect Proof	(Indirect proofs are proofs by contradiction.) **9.3.2.4** Construct logical arguments and write proofs of theorems and other results in geometry, including proofs by contradiction. Express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts or illustrations.
5-6: Inequalities in One Triangle	**9.3.3.3** Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results. For example: Use the triangle inequality to prove that the perimeter of a quadrilateral is larger than the sum of the lengths of its diagonals.
5-7: Inequalities in Two Triangles	The Minnesota standards do not refer specifically to inequalities in two triangles.

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Chapter 6	
6-1: The Polygon Angle-Sum Theorems	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **6.3.2.3** Develop and use formulas for the sums of the interior angles of polygons by decomposing them into triangles.
6-2: Properties of Parallelograms	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **4.3.1.2** Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts. **3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
6-3: Proving That a Quadrilateral Is a Parallelogram	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides. For example: Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram. **4.3.1.2** Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts.

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(Continued) 6-3: Proving That a Quadrilateral Is a Parallelogram	**3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
6-4: Properties of Rhombuses, Rectangles, and Squares	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid. **4.3.1.2** Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts. **3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
6-5: Conditions for Rhombuses, Rectangles, and Squares	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides. For example: Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram. **4.3.1.2** Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts.

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(Continued) 6-5: Conditions for Rhombuses, Rectangles, and Squares	**3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
6-6: Trapezoids and Kites	**9.3.3.7** Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides. For example: Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram. **6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid. For example: The area of a kite is one-half the product of the lengths of the diagonals, and this can be justified by decomposing the kite into two triangles. **4.3.1.2** Describe, classify and draw quadrilaterals, including squares, rectangles, trapezoids, rhombuses, parallelograms and kites. Recognize quadrilaterals in various contexts. **3.3.1.1** Identify parallel and perpendicular lines in various contexts, and use them to describe and create geometric shapes, such as right triangles, rectangles, parallelograms and trapezoids.
6-7: Polygons in the Coordinate Plane	**9.3.4.4** Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides.

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6-8: Applying Coordinate Geometry	**9.3.4.4** Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments. **9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **8.3.1.2** Determine the distance between two points on a horizontal or vertical line in a coordinate system. Use the Pythagorean Theorem to find the distance between any two points in a coordinate system. **8.3.2.1** Understand and apply the relationships between the slopes of parallel lines and between the slopes of perpendicular lines. Dynamic graphing software may be used to examine these relationships. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides. For example: Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram. **8.3.2.3** Given a line on a coordinate system and the coordinates of a point not on the line, find lines through that point that are parallel and perpendicular to the given line, symbolically and graphically. **7.3.2.4** Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices of the figure after the transformation.

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6-9: Proofs Using Coordinate Geometry	**9.3.2.4** Construct logical arguments and write proofs of theorems and other results in geometry, including proofs by contradiction. Express proofs in a form that clearly justifies the reasoning, such as two-column proofs, paragraph proofs, flow charts or illustrations. **8.3.2.2** Analyze polygons on a coordinate system by determining the slopes of their sides. For example: Given the coordinates of four points, determine whether the corresponding quadrilateral is a parallelogram.
Chapter 7	
7-1: Ratios and Proportions	**7.1.2.5** Use proportional reasoning to solve problems involving ratios in various contexts. **7.2.2.1** Represent proportional relationships with tables, verbal descriptions, symbols, equations and graphs; translate from one representation to another. Determine the unit rate (constant of proportionality or slope) given any of these representations. **7.2.2.2** Solve multi-step problems involving proportional relationships in numerous contexts. **7.2.4.2** Solve equations resulting from proportional relationships in various contexts. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures. **7.3.2.3** Use proportions and ratios to solve problems involving scale drawings and conversions of measurement units. **6.1.2.1** Identify and use ratios to compare quantities; understand that comparing quantities using ratios is not the same as comparing quantities using subtraction.

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7-2: Similar Polygons	**9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **9.3.4.7** Use algebra to solve geometric problems unrelated to coordinate geometry, such as solving for an unknown length in a figure involving similar triangles, or using the Pythagorean Theorem to obtain a quadratic equation for a length in a geometric figure. **7.2.2.2** Solve multi-step problems involving proportional relationships in numerous contexts. For example: Distance-time, percent increase or decrease, discounts, tips, unit pricing, lengths in similar geometric figures, and unit conversion when a conversion factor is given, including conversion between different measurement systems. **7.2.4.2** Solve equations resulting from proportional relationships in various contexts. For example: Given the side lengths of one triangle and one side length of a second triangle that is similar to the first, find the remaining side lengths of the second triangle. **7.3.2.1** Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
7-3: Proving Triangles Similar	**9.3.3.2** Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results. For example: Prove that two triangles formed by a pair of intersecting lines and a pair of parallel lines (an "X" trapped between two parallel lines) are similar.

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7-4: Similarity in Right Triangles	**9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **7.2.2.2** Solve multi-step problems involving proportional relationships in numerous contexts. For example: Distance-time, percent increase or decrease, discounts, tips, unit pricing, lengths in similar geometric figures, and unit conversion when a conversion factor is given, including conversion between different measurement systems. **7.2.4.2** Solve equations resulting from proportional relationships in various contexts. For example: Given the side lengths of one triangle and one side length of a second triangle that is similar to the first, find the remaining side lengths of the second triangle. **7.3.2.1** Describe the properties of similarity, compare geometric figures for similarity, and determine scale factors. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
7-5: Proportions in Triangles	**7.2.2.2** Solve multi-step problems involving proportional relationships in numerous contexts. For example: Distance-time, percent increase or decrease, discounts, tips, unit pricing, lengths in similar geometric figures, and unit conversion when a conversion factor is given, including conversion between different measurement systems.

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(Continued) 7-5: Proportions in Triangles	**7.2.4.2** Solve equations resulting from proportional relationships in various contexts. For example: Given the side lengths of one triangle and one side length of a second triangle that is similar to the first, find the remaining side lengths of the second triangle.
Chapter 8	
8-1: The Pythagorean Theorem and Its Converse	**9.3.3.4** Apply the Pythagorean Theorem and its converse to solve problems and logically justify results. **8.3.1.1** Use the Pythagorean Theorem to solve problems involving right triangles.
8-2: Special Right Triangles	**9.3.3.5** Know and apply properties of right triangles, including properties of 45-45-90 and 30-60-90 triangles, to solve problems and logically justify results.
8-3: Trigonometry	**9.3.4.1** Understand how the properties of similar right triangles allow the trigonometric ratios to be defined, and determine the sine, cosine and tangent of an acute angle in a right triangle. **9.3.4.2** Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios. **9.3.4.3** Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.

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8-4: Angles of Elevation and Depression	The Minnesota standards do not refer specifically to angles of elevation or depression. **9.3.4.2** Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios. **9.3.4.3** Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.
8-5: Law of Sines	The Minnesota standards do not refer to the Law of Sines.
8-6: Law of Cosines	The Minnesota standards do not refer to the Law of Cosines.
Chapter 9	
9-1: Translations	**9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **7.3.2.4** Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices of the figure after the transformation. **4.3.3.1** Apply translations (slides) to figures. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.

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9-2: Reflections	**9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **7.3.2.4** Graph and describe translations and reflections of figures on a coordinate grid and determine the coordinates of the vertices of the figure after the transformation. **4.3.3.2** Apply reflections (flips) to figures by reflecting over vertical or horizontal lines and relate reflections to lines of symmetry. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.
9-3: Rotations	**9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **4.3.3.3** Apply rotations (turns) of 90° clockwise or counterclockwise. **4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.
9-4: Compositions of Isometries	**4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.
9-5: Congruence Transformations	**4.3.3.4** Recognize that translations, reflections and rotations preserve congruency and use them to show that two figures are congruent.

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9-6: Dilations	**9.3.1.4** Understand and apply the fact that the effect of a scale factor k on length, area and volume is to multiply each by k, k^2 and k^3, respectively. **9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **7.3.2** Analyze the effect of change of scale, translations and reflections on the attributes of two-dimensional figures. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
9-7: Similarity Transformations	**9.3.1.4** Understand and apply the fact that the effect of a scale factor k on length, area and volume is to multiply each by k, k^2 and k^3, respectively. **9.3.4.6** Use numeric, graphic and symbolic representations of transformations in two dimensions, such as reflections, translations, scale changes and rotations about the origin by multiples of 90°, to solve problems involving figures on a coordinate grid. **7.3.2** Analyze the effect of change of scale, translations and reflections on the attributes of two-dimensional figures. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.

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Chapter 10	
10-1: Areas of Parallelograms and Triangles	**6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid. **5.3.2.1** Develop and use formulas to determine the area of triangles, parallelograms and figures that can be decomposed into triangles.
10-2: Areas of Trapezoids, Rhombuses, and Kites	**6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.
10-3: Areas of Regular Polygons	The Minnesota standards do not refer specifically to the areas of regular polygons. **9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **6.3.1.2** Calculate the area of quadrilaterals. Quadrilaterals include squares, rectangles, rhombuses, parallelograms, trapezoids and kites. When formulas are used, be able to explain why they are valid.
10-4: Perimeters and Areas of Similar Figures	**9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. For example: Analyze lengths and areas in a figure formed by drawing a line segment from one side of a triangle to a second side, parallel to the third side. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.

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10-5: Trigonometry and Area	**9.3.4.2** Apply the trigonometric ratios sine, cosine and tangent to solve problems, such as determining lengths and areas in right triangles and in figures that can be decomposed into right triangles. Know how to use calculators, tables or other technology to evaluate trigonometric ratios. For example: Find the area of a triangle, given the measure of one of its acute angles and the lengths of the two sides that form that angle.
10-6: Circles and Arcs	The Minnesota standards do not refer specifically to circles and arcs. **7.3.1.1** Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π. Calculate the circumference and area of circles and sectors of circles to solve problems in various contexts.
10-7: Areas of Circles and Sectors	**7.3.1.1** Demonstrate an understanding of the proportional relationship between the diameter and circumference of a circle and that the unit rate (constant of proportionality) is π. Calculate the circumference and area of circles and sectors of circles to solve problems in various contexts.
10-8: Geometric Probability	**7.4.3.2** Calculate probability as a fraction of sample space or as a fraction of area. Express probabilities as percents, decimals and fractions. For example: Determine probabilities for different outcomes in game spinners by finding fractions of the area of the spinner.

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Chapter 11	
11-1: Space Figures and Cross Sections	The Minnesota standards do not refer specifically to cross sections of space figures. **9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **6.3.1.1** Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models.
11-2: Surface Areas of Prisms and Cylinders	**9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **7.3.1.2** Calculate the volume and surface area of cylinders and justify the formulas used. **6.3.1.1** Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models. **5.3.2.2** Use various tools and strategies to measure the volume and surface area of objects that are shaped like rectangular prisms.
11-3: Surface Areas of Pyramids and Cones	**9.3.1.1** Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate. **9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.

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11-4: Volumes of Prisms and Cylinders	**9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures. **7.3.1.2** Calculate the volume and surface area of cylinders and justify the formulas used. **6.3.1.1** Calculate the surface area and volume of prisms and use appropriate units, such as cm^2 and cm^3. Justify the formulas used. Justification may involve decomposition, nets or other models. **5.3.2.2** Use various tools and strategies to measure the volume and surface area of objects that are shaped like rectangular prisms.
11-5: Volumes of Pyramids and Cones	**9.3.1.1** Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate. **9.3.1.2** Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.
11-6: Surface Areas and Volumes of Spheres	**9.3.1.1** Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.

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11-7: Areas and Volumes of Similar Solids	The Minnesota standards do not refer specifically to areas and volumes of similar solids. **9.3.3.6** Know and apply properties of congruent and similar figures to solve problems and logically justify results. **9.3.4.7** Use algebra to solve geometric problems unrelated to coordinate geometry, such as solving for an unknown length in a figure involving similar triangles, or using the Pythagorean Theorem to obtain a quadratic equation for a length in a geometric figure. **7.3.2.2** Apply scale factors, length ratios and area ratios to determine side lengths and areas of similar geometric figures.
Chapter 12	
12-1: Tangent Lines	The Minnesota standards do not refer to tangent lines.
12-2: Chords and Arcs	The Minnesota standards do not refer to chords and arcs.
12-3: Inscribed Angles	The Minnesota standards do not refer to inscribed angles.
12-4: Angle Measures and Segment Lengths	The Minnesota standards do not refer to angle measures and segment lengths in a circle.
12-5: Circles in the Coordinate Plane	**9.3.4.5** Know the equation for the graph of a circle with radius r and center (h, k), $(x - h)^2 + (y - k)^2 = r^2$, and justify this equation using the Pythagorean Theorem and properties of translations.
12-6: Locus: A Set of Points	The Minnesota standards do not refer specifically to the concept of locus.

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Chapter 13	
13-1: Experimental and Theoretical Probability	**9.4.3.1** Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities. **9.4.3.2** Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes. **9.4.3.3** Understand that the Law of Large Numbers expresses a relationship between the probabilities in a probability model and the experimental probabilities found by performing simulations or experiments involving the model. **9.4.3.5** Apply probability concepts such as intersections, unions and complements of events, and conditional probability and independence, to calculate probabilities and solve problems. **9.4.3.7** Understand and use simple probability formulas involving intersections, unions and complements of events. **7.4.3.1** Use random numbers generated by a calculator or a spreadsheet or taken from a table to simulate situations involving randomness, make a histogram to display the results, and compare the results to known probabilities. **6.4.1.3** Perform experiments for situations in which the probabilities are known, compare the resulting relative frequencies with the known probabilities; know that there may be differences.

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(Continued) 13-1: Experimental and Theoretical Probability	**6.4.1.4** Calculate experimental probabilities from experiments; represent them as percents, fractions and decimals between 0 and 1 inclusive. Use experimental probabilities to make predictions when actual probabilities are unknown.
13-2: Probability Distributions and Frequency Tables	**9.4.3.2** Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes. **7.4.3.3** Use proportional reasoning to draw conclusions about and predict relative frequencies of outcomes based on probabilities.
13-3: Permutations and Combinations	The Minnesota standards do not refer specifically to permutations and combinations. **9.4.3.1** Select and apply counting procedures, such as the multiplication and addition principles and tree diagrams, to determine the size of a sample space (the number of possible outcomes) and to calculate probabilities.
13-4: Compound Probability	**9.4.3.5** Apply probability concepts such as intersections, unions and complements of events, and conditional probability and independence, to calculate probabilities and solve problems. **9.4.3.7** Understand and use simple probability formulas involving intersections, unions and complements of events.
13-5: Probability Models	**9.4.3.2** Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.

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(Continued) 13-5: Probability Models	**9.4.3.3** Understand that the Law of Large Numbers expresses a relationship between the probabilities in a probability model and the experimental probabilities found by performing simulations or experiments involving the model. **9.4.3.4** Use random numbers generated by a calculator or a spreadsheet, or taken from a table, to perform probability simulations and to introduce fairness into decision making. **9.4.3.8** Apply probability concepts to real-world situations to make informed decisions. **7.4.3.1** Use random numbers generated by a calculator or a spreadsheet or taken from a table to simulate situations involving randomness, make a histogram to display the results, and compare the results to known probabilities.
13-6: Conditional Probability Formulas	**9.4.3.9** Use the relationship between conditional probabilities and relative frequencies in contingency tables.
13-7: Modeling Randomness	**9.4.3.3** Understand that the Law of Large Numbers expresses a relationship between the probabilities in a probability model and the experimental probabilities found by performing simulations or experiments involving the model. **9.4.3.4** Use random numbers generated by a calculator or a spreadsheet, or taken from a table, to perform probability simulations and to introduce fairness into decision making. **7.4.3.1** Use random numbers generated by a calculator or a spreadsheet or taken from a table to simulate situations involving randomness, make a histogram to display the results, and compare the results to known probabilities.