

**The  
University of  
Chicago  
School  
Mathematics  
Project**



# Geometry



Correlated to  
Minnesota  
Academic Standards for  
Mathematics



Grade 9



**McGraw-Hill Geometry ©2009**  
**correlated to**  
**Grade 9**  
**Minnesota Academic Standards for Mathematics**

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<b>ASSESSMENT ANCHOR</b>	
<b>Algebra</b> Understand the concept of function, and identify important features of functions and other relations using symbolic and graphical methods where appropriate.	
<b>9.2.1.1</b> Understand the definition of a function. Use functional notation and evaluate a function at a given point in its domain.	See <i>UCSMP Advanced Algebra</i> : PE: 4–5, 14–17, 20–25, 26–32, 62–63, 64–65, 66–69 TE: 4–5, 14–17, 20–25, 26–32, 62–63, 64–65, 66–69
<b>9.2.1.2</b> Distinguish between functions and other relations defined symbolically, graphically or in tabular form.	See <i>UCSMP Advanced Algebra</i> : PE: 14–19, 64–65, 66–69 TE: 14–19, 64–65, 66–69
<b>9.2.1.3</b> Find the domain of a function defined symbolically, graphically or in a real-world context.	See <i>UCSMP Advanced Algebra</i> : PE: 26–32, 33–39, 62–63, 64–65, 66–69 TE: 26–32, 33–39, 62–63, 64–65, 66–69
<b>9.2.1.4</b> Obtain information and draw conclusions from graphs of functions and other relations.	See <i>UCSMP Advanced Algebra</i> : PE: 26–32, 33–39, 64–65, 66–69 TE: 26–32, 33–39, 64–65, 66–69
<b>9.2.1.5</b> Identify the vertex, line of symmetry and intercepts of the parabola corresponding to a quadratic function, using symbolic and graphical methods, when the function is expressed in the form $f(x) = ax^2 + bx + c$ , in the form $f(x) = a(x - h)^2 + k$ , or in factored form.	See <i>UCSMP Advanced Algebra</i> : PE: 102, 372–373, 386–392, 393–400, 401–407, 441–442, 443–444, 445, 446–449 TE: 102, 372–373, 386–392, 393–400, 401–407, 441–442, 443–444, 445, 446–449
<b>9.2.1.6</b> Identify intercepts, zeros, maxima, minima and intervals of increase and decrease from the graph of a function.	See <i>UCSMP Advanced Algebra</i> : PE: 150–151, 163–168, 212, 213–214, 215–219, 388, 437 TE: 150–151, 163–168, 212, 213–214, 215–219, 388, 437
<b>9.2.1.7</b> Understand the concept of an asymptote and identify asymptotes for exponential functions and reciprocals of linear functions, using symbolic and graphical methods.	See <i>UCSMP Advanced Algebra</i> : PE: 106–113, 581 TE: 106–113, 581

PE: Pupil's Edition  
TE: Teacher's Edition

RM: Resource Master  
AR: Assessment Resources

LM: Lesson Master

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.2.1.8</b> Make qualitative statements about the rate of change of a function, based on its graph or table of values.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 93–99, 100–105, 136–137, 138–139, 140–142, 143–147 TE: 93–99, 100–105, 136–137, 138–139, 140–142, 143–147</p>
<p><b>9.2.1.9</b> Determine how translations affect the symbolic and graphical forms of a function. Know how to use graphing technology to examine translations</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 386–392, 443–444, 445, 446–449 TE: 386–392, 443–444, 445, 446–449</p>
<p><b>Algebra</b> Recognize linear, quadratic, exponential and other common functions in real-world and mathematical situations; represent these functions with tables, verbal descriptions, symbols and graphs; solve problems involving these functions, and explain results in the original context.</p>	
<p><b>9.2.2.1</b> Represent and solve problems in various contexts using linear and quadratic functions.</p>	<p>PE: 607 TE: 607</p>
<p><b>9.2.2.2</b> Represent and solve problems in various contexts using exponential functions, such as investment growth, depreciation and population growth.</p>	<p>PE: 786–787, 814 TE: 786–787, 814</p>
<p><b>9.2.2.3</b> Sketch graphs of linear, quadratic and exponential functions, and translate between graphs, tables and symbolic representations. Know how to use graphing technology to graph these functions.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 148–149, 150–156, 213–214, 215–219, 393–400, 446–449, 578–579, 580–586, 602–607, 656–659 TE: 148–149, 150–156, 213–214, 215–219, 393–400, 446–449, 578–579, 580–586, 602–607, 656–659</p>
<p><b>9.2.2.4</b> Express the terms in a geometric sequence recursively and by giving an explicit (closed form) formula, and express the partial sums of a geometric series recursively.</p>	<p>PE: 486, 799 TE: 486, 795</p>
<p><b>9.2.2.5</b> Recognize and solve problems that can be modeled using finite geometric sequences and series, such as home mortgage and other compound interest examples. Know how to use spreadsheets and calculators to explore geometric sequences and series in various contexts.</p>	<p>PE: 486, 799 TE: 486, 795</p>

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.2.2.6</b> Sketch the graphs of common non-linear functions such as <math>f(x)=\sqrt{x}</math>, <math>f(x)= x </math>, <math>f(x)=\frac{1}{x}</math>, <math>f(x)=x^3</math>, and translations of these functions, such as <math>f(x)=\sqrt{x-2}+4</math>. Know how to use graphing technology to graph these functions.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 308–310, 316–317 TE: 308–310, 316–317</p>
<p><b>Algebra</b> Generate equivalent algebraic expressions involving polynomials and radicals; use algebraic properties to evaluate expressions.</p>	
<p><b>9.2.3.1</b> Evaluate polynomial and rational expressions and expressions containing radicals and absolute values at specified points in their domains.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 380–385, 445, 446–449, 562–567, 572–573, 574–577, 728–729, 730–737, 790–791, 792–795 TE: 380–385, 445, 446–449, 562–567, 572–573, 574–577, 728–729, 730–737, 790–791, 792–795</p>
<p><b>9.2.3.2</b> Add, subtract and multiply polynomials; divide a polynomial by a polynomial of equal or lower degree.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 738–744, 766–771, 790–791, 792–795 TE: 738–744, 766–771, 790–791, 792–795</p>
<p><b>9.2.3.3</b> Factor common monomial factors from polynomials, factor quadratic polynomials, and factor the difference of two squares.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 745–751, 790–791, 792–795 TE: 745–751, 790–791, 792–795</p>
<p><b>9.2.3.4</b> Add, subtract, multiply, divide and simplify algebraic fractions.</p>	<p>PE: 43, 726–730 TE: 726–730 RM: 217 LM: 12-2A, 12-2B AR: Chapter 12 Test Forms A–D</p>
<p><b>9.2.3.5</b> Check whether a given complex number is a solution of a quadratic equation by substituting it for the variable and evaluating the expression, using arithmetic with complex numbers.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 766–771, 790–791, 792–795 TE: 766–771, 790–791, 792–795</p>
<p><b>9.2.3.6</b> Apply the properties of positive and negative rational exponents to generate equivalent algebraic expressions, including those involving <math>n^{\text{th}}</math> roots.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 486–492, 493–499, 500–504, 509, 510–513 TE: 486–492, 493–499, 500–504, 509, 510–513</p>

**McGraw-Hill Geometry ©2009**  
**correlated to**  
**Grade 9**  
**Minnesota Academic Standards for Mathematics**

<b>Minnesota Academic Standards for Mathematics</b>	<b>McGraw-Hill Geometry</b>
<p><b>9.2.3.7</b> Justify steps in generating equivalent expressions by identifying the properties used. Use substitution to check the equality of expressions for some particular values of the variables; recognize that checking with substitution does not guarantee equality of expressions for all values of the variables.</p>	<p>See <i>UCSMP Advanced Algebra</i>:            PE: 40–46, 752–759            TE: 40–46, 752–759</p>
<p><b>Algebra</b>            Represent real-world and mathematical situations using equations and inequalities involving linear, quadratic, exponential and nth root functions. Solve equations and inequalities symbolically and graphically. Interpret solutions in the original context.</p>	
<p><b>9.2.4.1</b> Represent relationships in various contexts using quadratic equations and inequalities. Solve quadratic equations and inequalities by appropriate methods including factoring, completing the square, graphing and the quadratic formula. Find non-real complex roots when they exist. Recognize that a particular solution may not be applicable in the original context. Know how to use calculators, graphing utilities or other technology to solve quadratic equations and inequalities.</p>	<p>PE: 661, 795–797            TE: 795</p>
<p><b>9.2.4.2</b> Represent relationships in various contexts using equations involving exponential functions; solve these equations graphically or numerically. Know how to use calculators, graphing utilities or other technology to solve these equations.</p>	<p>See <i>UCSMP Advanced Algebra</i>:            PE: 374–379, 380–385, 386–392, 393–400, 401–407, 414–419, 441–442, 445, 446–449            TE: 374–379, 380–385, 386–392, 393–400, 401–407, 414–419, 441–442, 445, 446–449</p>
<p><b>9.2.4.3</b> Recognize that to solve certain equations, number systems need to be extended from whole numbers to integers, from integers to rational numbers, from rational numbers to real numbers, and from real numbers to complex numbers. In particular, non-real complex numbers are needed to solve some quadratic equations with real coefficients.</p>	<p>See <i>UCSMP Advanced Algebra</i>:            PE: 580–586, 654–655, 656–659            TE: 580–586, 654–655, 656–659</p>

PE: Pupil's Edition  
 TE: Teacher's Edition

RM: Resource Master  
 AR: Assessment Resources

LM: Lesson Master

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.2.4.4</b> Represent relationships in various contexts using systems of linear inequalities; solve them graphically. Indicate which parts of the boundary are included in and excluded from the solution set using solid and dotted lines.</p>	<p>PE: 35–36, 82, 84 TE: 35–36, 82 RM: 16 LM: 1-5A, 1-5B</p>
<p><b>9.2.4.5</b> Solve linear programming problems in two variables using graphical methods.</p>	<p>See <i>UCSMP Advanced Algebra</i>: PE: 355–361, 362–363, 365–366, 367–371 TE: 355–361, 362–363, 365–366, 367–371</p>
<p><b>9.2.4.6</b> Represent relationships in various contexts using absolute value inequalities in two variables; solve them graphically.</p>	<p>PE: 8–11, 73–75, 653 TE: 8–11, 73–75 LM: 1-1A, 1-1B</p>
<p><b>9.2.4.7</b> Solve equations that contain radical expressions. Recognize that extraneous solutions may arise when using symbolic methods.</p>	<p>Representative pages: PE: 653, 675, 676–681, 682, 685–687, 690, 693, 696, 699, 702–704, 780 TE: 676–681, 683, 686, 688, 696, 702 RM: 201, 208, 210 LM: 11-5A, 11-5B, 11-6A, 11-6B, 11-9A, 11-9B AR: Chapter 11 Test Forms A–D</p>
<p><b>9.2.4.8</b> Assess the reasonableness of a solution in its given context and compare the solution to appropriate graphical or numerical estimates; interpret a solution in the original context.</p>	<p>PE: 495–497, 802, 803 TE: 495</p>
<p><b>Geometry &amp; Measurement</b> Calculate measurements of plane and solid geometric figures; know that physical measurements depend on the choice of a unit and that they are approximations.</p>	
<p><b>9.3.1.1</b> Determine the surface area and volume of pyramids, cones and spheres. Use measuring devices or formulas as appropriate.</p>	<p>PE: 570–576, 577–582, 596–602, 603–608, 609–614, 615–622, 628–632, 633–637, 638, 652, 785, 879–885 TE: 570–576, 577–582, 596–602, 603–608, 609–614, 615–622, 628–632, 633–637, 638, 652, 879–885 RM: 171–173, 174, 175, 176, 177, 178–180, 181, 182, 183, 184, 188–190, 191, 192, 259, 260 LM: 9-9A, 9-9B, 9-10A, 9-10B, 10-1A, 10-1B, 10-2A, 10-2B, 10-3A, 10-3B, 10-4A, 10-4B, 10-6A, 10-6B, 14-9A, 14-9B AR: Chapter 9 Test Forms A–D, Chapter 10 Test Forms A–D, Chapter 14 Test Forms A–D</p>

PE: Pupil's Edition

RM: Resource Master

LM: Lesson Master

TE: Teacher's Edition

AR: Assessment Resources

**McGraw-Hill Geometry ©2009**  
**correlated to**  
**Grade 9**  
**Minnesota Academic Standards for Mathematics**

<b>Minnesota Academic Standards for Mathematics</b>	<b>McGraw-Hill Geometry</b>
<b>9.3.1.2</b> Compose and decompose two- and three-dimensional figures; use decomposition to determine the perimeter, area, surface area and volume of various figures.	PE: 452–456, 457–462, 463–467, 468–473, 474–479, 499, 500–505, 525–531, 532–537, 544–549, 550–558, 564–569, 570–576, 577–582, 603–608, 609–614 TE: 452–456, 457–462, 463–467, 468–473, 474–479, 499, 500–505, 525–531, 532–537, 544–549, 550–558, 564–569, 570–576, 577–582, 603–608, 609–614 RM: 127, 128, 129, 130, 131–133, 134–136, 137–139, 147–149, 152–154, 155–156, 160, 161, 162–165, 168–170, 171–173, 174, 175, 178–180 LM: 8-1A, 8-1B, 8-2A, 8-2B, 8-3A, 8-3B, 8-4A, 8-4B, 8-5A, 8-5B, 8-9A, 8-9B, 9-2A, 9-2B, 9-3A, 9-3B, 9-5A, 9-5B, 9-6A, 9-6B, 9-8A, 9-8B, 9-9A, 9-9B, 9-10A, 9-10B, 10-2A, 10-2B, 10-3A, 10-3B AR: Chapter 8 Test Forms A–D, Chapter 9 Test Forms A–D, Chapter 10 Test Forms A–D
<b>9.3.1.3</b> Understand that quantities associated with physical measurements must be assigned units; apply such units correctly in expressions, equations and problem solutions that involve measurements; and convert between measurement systems.	PE: 456, 457–462, 495, 597, 601, 610, 758, 846 TE: 457–462, 495 RM: 129, 130 LM: 8-2A, 8-2B AR: Chapter 8 Test Forms A–D
<b>9.3.1.4</b> 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.	PE: 734–737 TE: 734–737 RM: 218, 219 LM: 12-3A, 12-3B AR: Chapter 12 Test Forms A–D
<b>9.3.1.5</b> Make reasonable estimates and judgments about the accuracy of values resulting from calculations involving measurements.	PE: 463–467, 495, 524, 761, 785, 802–803 TE: 463–467, 760, 785, 803, 811 RM: 131–133 LM: 8-3A, 8-3B AR: Chapter 8 Test Forms A–D

PE: Pupil's Edition  
 TE: Teacher's Edition

RM: Resource Master  
 AR: Assessment Resources

LM: Lesson Master

**McGraw-Hill Geometry ©2009**  
**correlated to**  
**Grade 9**  
**Minnesota Academic Standards for Mathematics**

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<b>Geometry &amp; Measurement</b> Construct logical arguments, based on axioms, definitions and theorems, to prove theorems and other results in geometry.	
<b>9.3.2.1</b> Understand the roles of axioms, definitions, undefined terms and theorems in logical arguments.	PE: 8, 20, 27–31, 39–43, 60–65, 76–82 TE: 8, 20, 27–31, 39–43, 60–65, 76–82 RM: 14, 15, 17, 18, 20, 25 LM: 1-4A, 1-4B, 1-6A, 1-6B, 2-1A, 2-1B, 2-4A, 2-4B AR: Chapter 1 Test Forms A–D, Chapter 2 Test Forms A–D
<b>9.3.2.2</b> 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.	PE: 56–71, 72–76, 77–82, 95–100, 654–662 TE: 56–71, 72–76, 77–82, 95–100, 654–662 RM: 21, 22, 23, 24, 25, 29, 196 LM: 2-2A, 2-2B, 2-3A, 2-3B, 2-4A, 2-4B, 2-7A, 2-7B, 11-2A, 11-2B AR: Chapter 2 Test Forms A–D, Chapter 11 Test Forms A–D
<b>9.3.2.3</b> Assess the validity of a logical argument and give counterexamples to disprove a statement.	PE: 68–69, 95–100, 648–653, 663–669, 708 TE: 68, 95–100, 648–653, 663–669, 708 RM: 29, 193–195, 197, 198 LM: 2-7A, 2-7B, 11-1A, 11-1B, 11-3A, 11-3B AR: Chapter 2 Test Forms A–D, Chapter 11 Test Forms A–D
<b>9.3.2.4</b> 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.	PE: 139–144, 154–155, 263–268, 269–276, 277–281, 297, 319–322, 328–329, 338, 343, 346, 348, 360, 361, 387, 390, 392, 393–398, 401–405, 407, 411, 412, 420, 428, 434, 437, 475, 476, 666, 667, 670–675, 762, 776, 782, 800, 843, 850, 867 TE: 139–144, 154, 263–268, 269–276, 277–281, 297, 321, 338, 342, 347, 389, 393–398, 401–403, 410, 420–421, 424, 477, 666, 667, 670–675, 776, 789 RM: 40, 74, 77, 80, 92, 108, 110, 111, 113, 115, 199, 200 LM: 3-4A, 3-4B, 5-3A, 5-3B, 5-4A, 5-4B, 5-5A, 5-5B, 6-5A, 6-5B, 6-6A, 6-6B, 7-3A, 7-3B, 7-4A, 7-4B, 7-5A, 7-5B, 7-10A, 7-10B, 11-3A, 11-3B, 11-4A, 11-4B AR: Chapter 3 Test Forms A–D, Chapter 5 Test Forms A–D, Chapter 11 Test Forms A–D

PE: Pupil's Edition  
TE: Teacher's Edition

RM: Resource Master  
AR: Assessment Resources

LM: Lesson Master

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.3.2.5</b> 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.</p>	<p>PE: 44–50, 51, 97–98, 145–146, 147, 150, 161, 165–171, 184–188, 210–215, 216–222, 229, 269–270, 287, 317–318, 324, 339–340, 381–383, 414, 417, 422, 426–427, 433, 436, 441, 470, 480, 482, 493, 528, 535, 541, 546, 552, 615–616, 694–695, 722, 774, 781, 783, 791, 837–838, 860–863, 866, 888</p> <p>TE: 44–50, 51, 97, 150, 165–171, 184–188, 210–215, 216–222, 441, 888</p> <p>RM: 19, 45, 46, 47, 57, 60, 61</p> <p>LM: 1-7A, 1-7B, 3-9A, 3-9B, 4-1A, 4-1B, 4-5A, 4-5B, 4-6A, 4-6B</p> <p>AR: Chapter 3 Test Forms A–D, Chapter 4 Test Forms A–D</p>
<p><b>Geometry &amp; Measurement</b> Know and apply properties of geometric figures to solve real-world and mathematical problems and to logically justify results in geometry.</p>	
<p><b>9.3.3.1</b> Know and apply properties of parallel and perpendicular lines, including properties of angles formed by a transversal, to solve problems and logically justify results.</p>	<p>PE: 35–37, 145–150, 159–164, 165–171, 270–275, 277–281, 283–285</p> <p>TE: 35–37, 145–150, 159–164, 165–171, 270–275, 277–281, 282–284</p> <p>RM: 16, 41, 43, 44, 45, 46, 80, 81</p> <p>LM: 1-5A, 1-5B, 3-6A, 3-6B, 3-8A, 3-8B, 3-9A, 3-9B, 5-4A, 5-4B, 5-5A, 5-5B</p> <p>AR: Chapter 1 Test Forms A–D, Chapter 3 Test Forms A–D, Chapter 5 Test Forms A–D</p>
<p><b>9.3.3.2</b> Know and apply properties of angles, including corresponding, exterior, interior, vertical, complementary and supplementary angles, to solve problems and logically justify results.</p>	<p>PE: 112–119, 126–132, 154–155, 288–295, 310–311, 324–330, 781–785</p> <p>TE: 112–119, 126–132, 154, 288–295, 310, 324–330, 781–785</p> <p>RM: 30, 31, 35, 36, 84–88, 92, 93, 231–233</p> <p>LM: 3-1A, 3-1B, 3-3A, 3-3B, 5-7A, 5-7B, 6-3A, 6-3B, 13-2A, 13-2B</p> <p>AR: Chapter 3 Test Forms A–D, Chapter 5 Test Forms A–D, Chapter 6 Test Forms A–D, Chapter 13 Test Forms A–D</p>

PE: Pupil's Edition

RM: Resource Master

LM: Lesson Master

TE: Teacher's Edition

AR: Assessment Resources

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.3.3.3</b> Know and apply properties of equilateral, isosceles and scalene triangles to solve problems and logically justify results.</p>	<p>PE: 47–50, 91–93, 316–323, 380–385, 386–392, 393–399, 400–405, 406–412                      TE: 47–50, 91–93, 316–323, 380–385, 386–392, 393–399, 400–405, 406–412                      RM: 19, 90, 91, 107, 108, 109, 110–112, 113, 114, 115, 116                      LM: 1-7A, 1-7B, 6-2A, 6-2B, 7-1A, 7-1B, 7-2A, 7-2B, 7-3A, 7-3B, 7-4A, 7-4B, 7-5A, 7-5B                      AR: Chapter 1 Test Forms A–D, Chapter 6 Test Forms A–D, Chapter 7 Test Forms A–D</p>
<p><b>9.3.3.4</b> Apply the Pythagorean Theorem and its converse to solve problems and logically justify results.</p>	<p>PE: 480–486, 493, 505, 507, 676–681, 685, 686, 687, 702, 753, 786–792, 846                      TE: 480–486, 507, 676–681, 702, 753, 786–792                      RM: 140–142, 201, 202, 234, 235                      LM: 8-6A, 8-6B, 11-5A, 11-5B, 13-3A, 13-3B                      AR: Chapter 8 Test Forms A–D, Chapter 11 Test Forms A–D, Chapter 13 Test Forms A–D</p>
<p><b>9.3.3.5</b> 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.</p>	<p>PE: 487–493, 499, 662, 762, 798, 800–806                      TE: 487–493, 800–806                      RM: 143, 144, 238, 239                      LM: 8-7A, 8-7B, 13-5A, 13-5B                      AR: Chapter 8 Test Forms A–D, Chapter 13 Test Forms A–D</p>
<p><b>9.3.3.6</b> Know and apply properties of congruent and similar figures to solve problems and logically justify results.</p>	<p>PE: 252–256, 257–262, 263–268, 269–276, 296, 380–385, 386–392, 393–399, 400–405, 406–412, 413–418, 731–737, 738–744, 750–755, 756–763, 764, 774–780, 793–799, 814                      TE: 252–256, 257–262, 263–268, 269–276, 296, 380–385, 386–392, 393–399, 400–405, 406–412, 413–418, 731–737, 738–744, 750–755, 756–763, 764, 774–780, 793–799, 814                      RM: 69, 70, 71, 72–75, 76–79, 107, 108, 109, 115, 116, 117, 118, 218, 219, 220, 221, 223, 224, 225–227, 228–230, 236, 237                      LM: 5-1A, 5-1B, 5-2A, 5-2B, 5-3A, 5-3B, 5-4A, 5-4B, 7-1A, 7-1B, 7-2A, 7-2B, 7-3A, 7-3B, 7-4A, 7-4B, 7-5A, 7-5B, 12-3A, 12-3B, 12-4A, 12-4B, 12-6A, 12-6B, 12-7A, 12-7B, 13-1A, 13-1B, 13-4A, 13-4B                      AR: Chapter 5 Test Forms A–D, Chapter 7 Test Forms A–D, Chapter 12 Test Forms A–D, Chapter 13 Test Forms A–D</p>

PE: Pupil’s Edition

RM: Resource Master

LM: Lesson Master

TE: Teacher’s Edition

AR: Assessment Resources

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.3.3.7</b> Use properties of polygons—including quadrilaterals and regular polygons—to define them, classify them, solve problems and logically justify results.</p>	<p>PE: 89–94, 101, 288–295, 297, 331–338, 339–344, 345–350, 356–362, 368, 419–425, 426–430, 431–435, 694–699                      TE: 89–94, 101, 288–295, 297, 331–338, 339–344, 345–350, 368, 419–425, 426–430, 431–435, 694–699                      RM: 27, 28, 84–86, 94–97, 98, 99, 100, 103, 104, 121, 122, 123, 207–209                      LM: 2-5A, 2-5B, 5-7A, 5-7B, 6-4A, 6-4B, 6-5A, 6-5B, 6-6A, 6-6B, 6-8A, 6-8B, 7-7A, 7-7B, 7-8A, 7-8B, 7-9A, 7-9B, 11-8A, 11-8B                      AR: Chapter 2 Test Forms A–D, Chapter 5 Test Forms A–D, Chapter 6 Test Forms A–D, Chapter 7 Test Forms A–D, Chapter 11 Test Forms A–D</p>
<p><b>9.3.3.8</b> Know and apply properties of a circle to solve problems and logically justify results.</p>	<p>PE: 494–499, 500–505, 704, 798, 824–830, 836, 837–843, 844–851, 852–858, 859–865, 866–871, 872–878                      TE: 494–499, 500–505, 704, 824–830, 837–843, 844–851, 852–858, 859–865, 866–871, 872–878                      RM: 145, 146, 147–149, 243, 244, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258                      LM: 8-8A, 8-8B, 8-9A, 8-9B, 14-1A, 14-1B, 14-3A, 14-3B, 14-4A, 14-4B, 14-5A, 14-5B, 14-6A, 14-6B, 14-7A, 14-7B, 14-8A, 14-8B                      AR: Chapter 8 Test Forms A–D, Chapter 14 Test Forms A–D</p>
<p><b>Geometry &amp; Measurement</b> Solve real-world and mathematical geometric problems using algebraic methods.</p>	
<p><b>9.3.4.1</b> 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.</p>	<p>PE: 800–806, 807–813                      TE: 800–806, 807–813                      RM: 238, 239, 240–242                      LM: 13-5A, 13-5B, 13-6A, 13-6B                      AR: Chapter 13 Test Forms A–D</p>
<p><b>9.3.4.2</b> 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.</p>	<p>PE: 800–806, 807–813                      TE: 800–806, 807–813                      RM: 238, 239, 240–242                      LM: 13-5A, 13-5B, 13-6A, 13-6B                      AR: Chapter 13 Test Forms A–D</p>

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>9.3.4.3</b> Use calculators, tables or other technologies in connection with the trigonometric ratios to find angle measures in right triangles in various contexts.</p>	<p>PE: 800–806, 807–813 TE: 800–806, 807–813 RM: 238, 239, 240–242 LM: 13-5A, 13-5B, 13-6A, 13-6B AR: Chapter 13 Test Forms A–D</p>
<p><b>9.3.4.4</b> Use coordinate geometry to represent and analyze line segments and polygons, including determining lengths, midpoints and slopes of line segments.</p>	<p>PE: 13–18, 84, 163, 193, 218, 221, 228, 670–675, 676–679, 688–693, 708 TE: 13–18, 162–163, 165, 219, 670–675, 678, 688–693, 708 RM: 9, 10, 45, 61, 199, 200, 205, 206 LM: 1-2A, 1-2B, 11-4A, 11-4B, 11-5A, 11-5B, 11-7A, 11-7B AR: Chapter 1 Test Forms A–D, Chapter 11 Test Forms A–D</p>
<p><b>9.3.4.5</b> Know the equation for the graph of a circle with radius <math>r</math> and center <math>(h, k)</math>, <math>(x - h)^2 + (y - k)^2 = r^2</math>, and justify this equation using the Pythagorean Theorem and properties of translations.</p>	<p>PE: 682–687 TE: 682–687 RM: 203, 204 LM: 11-6A, 11-6B AR: Chapter 11 Test Forms A–D</p>
<p><b>9.3.4.6</b> 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 <math>90^\circ</math>, to solve problems involving figures on a coordinate grid.</p>	<p>PE: 120–125, 151–158, 172, 184–188, 189–195, 196–201, 202–209, 210–215, 216–222, 223–229, 241, 277–281, 559–563, 718–725 TE: 120–125, 151–158, 172, 184–188, 189–195, 196–201, 202–209, 210–215, 216–222, 223–229, 241, 277–281, 559–563, 718–725 RM: 31–34, 42, 47, 48, 49–51, 52–54, 55, 56, 57–59, 60–62, 63–65, 80, 81, 166, 167, 213–216 LM: 3-2A, 3-2B, 3-7A, 3-B, 4-1A, 4-1B, 4-2A, 4-2B, 4-3A, 4-3B, 4-4A, 4-4B, 4-5A, 4-5B, 4-6A, 4-6B, 4-7A, 4-7B, 5-5A, 5-5B, 9-7A, 9-7B AR: Chapter 3 Test Forms A–D, Chapter 4 Test Forms A–D, Chapter 9 Test Forms A–D, Chapter 12 Test Forms A–D</p>
<p><b>9.3.4.7</b> 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.</p>	<p>Algebra is used throughout the Geometry program. Representative pages: PE: 14–17, 133–138, 676–681, 685, 686, 687, 702, 720, 721, 753 TE: 14–17, 133–138, 676–681, 702, 720, 753, 757 RM: 37–39, 201, 202 LM: 1-2A, 1-2B, 3-4A, 3-4B, 11-5A, 11-5B AR: Chapter 3 Test Forms A–D, Chapter 11 Test Forms A–D</p>

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<p><b>Data Analysis &amp; Probability</b> Display and analyze data; use various measures associated with data to draw conclusions, identify trends and describe relationships.</p>	
<p><b>9.4.1.1</b> Describe a data set using data displays, including box-and-whisker plots; describe and compare data sets using summary statistics, including measures of center, location and spread. Measures of center and location include mean, median, quartile and percentile. Measures of spread include standard deviation, range and inter-quartile range. Know how to use calculators, spreadsheets or other technology to display data and calculate summary statistics.</p>	<p>See <i>UCSMP Algebra</i>: PE: 47–54, 191–192, 290–292 TE: 47–54, 191–192, 290–292</p>
<p><b>9.4.1.2</b> Analyze the effects on summary statistics of changes in data sets.</p>	<p>See <i>UCSMP Algebra</i>: PE: 50–51 TE: 50–51</p>
<p><b>9.4.1.3</b> 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.</p>	<p>See <i>UCSMP Algebra</i>: PE: 27–28, 37–41, 369–370, 374–380, 419–423 TE: 27–28, 37–41, 369–370, 374–380, 419–423</p>
<p><b>9.4.1.4</b> Use the mean and standard deviation of a data set to fit it to a normal distribution (bell-shaped curve) and to estimate population percentages. Recognize that there are data sets for which such a procedure is not appropriate. Use calculators, spreadsheets and tables to estimate areas under the normal curve.</p>	<p>See <i>UCSMP Algebra</i>: PE: 50–51, 396–397, 414–415 TE: 50–51, 396–397, 414–415</p>

**McGraw-Hill Geometry ©2009**  
**correlated to**  
**Grade 9**  
**Minnesota Academic Standards for Mathematics**

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<b>Data Analysis &amp; Probability</b> Explain the uses of data and statistical thinking to draw inferences, make predictions and justify conclusions.	
<b>9.4.2.1</b> Evaluate reports based on data published in the media by identifying the source of the data, the design of the study, and the way the data are analyzed and displayed. Show how graphs and data can be distorted to support different points of view. Know how to use spreadsheet tables and graphs or graphing technology to recognize and analyze distortions in data displays.	See <i>UCSMP Transition Mathematics</i> : PE: 741–742, 743–744 TE: 740–742, 743–744
<b>9.4.2.2</b> Identify and explain misleading uses of data; recognize when arguments based on data confuse correlation and causation.	See <i>UCSMP Transition Mathematics</i> : PE: 741–742, 743–744 TE: 740–742, 743–744
<b>9.4.2.3</b> Design simple experiments and explain the impact of sampling methods, bias and the phrasing of questions asked during data collection	See <i>UCSMP Pre-Transition Mathematics</i> : PE: 748–752, 753–755 TE: 748–752, 753–755
<b>Data Analysis &amp; Probability</b> Calculate probabilities and apply probability concepts to solve real-world and mathematical problems.	
<b>9.4.3.1</b> 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.	See <i>UCSMP Pre-Transition Mathematics</i> : PE: 586–590, 591–596, 597–602 TE: 586–590, 591–596, 597–602
<b>9.4.3.2</b> Calculate experimental probabilities by performing simulations or experiments involving a probability model and using relative frequencies of outcomes.	See <i>UCSMP Transition Mathematics</i> : PE: 187–193 TE: 187–193
<b>9.4.3.3</b> 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.	See <i>UCSMP Transition Mathematics</i> : PE: 191 TE: 191

PE: Pupil's Edition

RM: Resource Master

LM: Lesson Master

TE: Teacher's Edition

AR: Assessment Resources

Minnesota Academic Standards for Mathematics

Minnesota Academic Standards for Mathematics	McGraw-Hill Geometry
<b>9.4.3.4</b> 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.	See <i>UCSMP Transition Mathematics</i> : PE: 190 TE: 190
<b>9.4.3.5</b> Apply probability concepts such as intersections, unions and complements of events, and conditional probability and independence, to calculate probabilities and solve problems.	PE: 502–503 TE: 500, 502
<b>9.4.3.6</b> Describe the concepts of intersections, unions and complements using Venn diagrams. Understand the relationships between these concepts and the words AND, OR, NOT, as used in computerized searches and spreadsheets.	PE: 69–71, 73–76, 83–88, 101, 102 TE: 69–71, 73–76, 79, 83–88, 101, 102 RM: 21, 22, 24, 26 LM: 2-2A, 2-2B, 2-5A, 2-5B AR: Chapter 2 Test Forms A–D
<b>9.4.3.7</b> Understand and use simple probability formulas involving intersections, unions and complements of events.	PE: 502–503 TE: 500, 502
<b>9.4.3.8</b> Apply probability concepts to real-world situations to make informed decisions.	PE: 503, 507 TE: 502, 507
<b>9.4.3.9</b> Use the relationship between conditional probabilities and relative frequencies in contingency tables.	See <i>UCSMP Transition Mathematics</i> : TE: 507