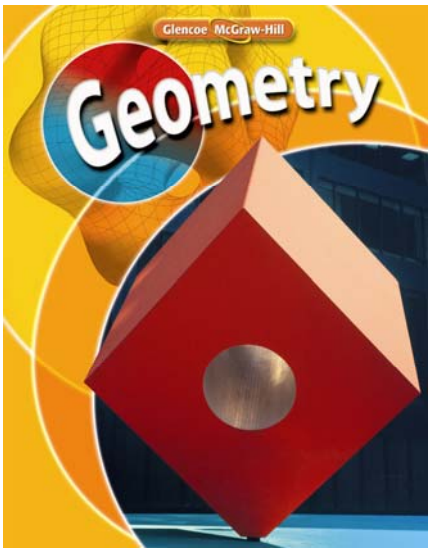
Glencoe

Content Expectations for
Geometry
High School



Geometry

STANDARDS		PAGE REFERENCES
STANDARD L1: REASONING ABOUT NUMBERS, SYSTEMS, AND QUANTITATIVE SITUATIONS		
L1.1 Number Systems and Number Sense		
L1.1.6	Explain the importance of the irrational numbers $\sqrt{2}$ and $\sqrt{3}$ in basic right triangle trigonometry, the importance of π because of its role in circle relationships, and the role of *e* in applications such as continuously compounded interest.	**Student Edition:** 54 #4, #5c, 55 #13, #15-#16, #19, 56 #33-#34, 63 Example 3, #2, #5, 64 #10, #17, 448-454, 556-560 *Foldables Study Organizer* 486 Special Right Triangles *Key Concept* 51, 52
L1.2 Representations and Relationships		
L1.2.3	Use vectors to represent quantities that have magnitude and direction, interpret direction and magnitude of a vector numerically, and calculate the sum and difference of two vectors.	**Student Edition:** 534-541 *Graphing Calculator Lab* 542 *Reading Math* 533 *Study Guide and Review* 546 9-6
L2.1 Calculation Using Real and Complex Numbers		
L2.1.6	Recognize when exact answers aren't always possible or practical. Use appropriate algorithms to approximate solutions to equations (e.g., to approximate square roots).	**Student Edition:** 13-20, 399-401, 660 Example 3, 694 Example 2, 730 Example 2 *Study Tip* 14, 660

Codes used for Teacher Wraparound Edition pages are the initial caps of headings on that page.

STANDARDS		PAGE REFERENCES
	L3.1 Measurement Units, Calculations, and Scales	
L3.1.1	Convert units of measurement within and between systems; explain how arithmetic operations on measurements affect units, and carry units through calculations correctly.	**Student Edition:** 20 #61, 391 Example 5 *Prerequisite Skills* 776-777 *Study Tip* 14 Units of Measure
	L4.1 Mathematical Reasoning	
L4.1.1	Distinguish between inductive and deductive reasoning, identifying and providing examples of each.	**Student Edition:** 78-82, 99-104, 109 #30, 111-112, 403 #39 *Vocabulary Check* 132
L4.1.2	Differentiate between statistical arguments (statements verified empirically using examples or data) and logical arguments based on the rules of logic.	**Student Edition:** 78-79, 83, 99, 111
L4.1.3	Define and explain the roles of axioms (postulates), definitions, theorems, counterexamples, and proofs in the logical structure of mathematics. Identify and give examples of each.	**Student Edition:** 105-106, 109 #25, #27, 111-112, 116 #30, 118-119
	L4.2 Language and Laws of Logic	
L4.2.1	Know and use the terms of basic logic (e.g., proposition, negation, truth and falsity, implication, if and only if, contrapositive, and converse).	**Student Edition:** 83-90, 91-97 *Reading Math* 98 *Study Guide and Review* 132, 134 3-2
L4.2.2	Use the connectives “not,” “and,” “or,” and “if..., then,” in mathematical and everyday settings. Know the truth table of each connective and how to logically negate statements involving these connectives.	**Student Edition:** 83-89, 91-95, 99 Example 1, 100-104, 113, 114-115 #6-#17, 117 #39-#42 *Study Guide and Review* 133 2-2
L4.2.3	Use the quantifiers “there exists” and “all” in mathematical and everyday settings and know how to logically negate statements involving them.	The concepts of “there exists” and “all” are used in the following examples. **Student Edition:** 81 #36, 105-106
L4.2.4	Write the converse, inverse, and contrapositive of an “If..., then...” statement. Use the fact, in mathematical and everyday settings, that the contrapositive is logically equivalent to the original while the inverse and converse are not.	**Student Edition:** 93-97, 104 #36, 109 #31 *Mid-Chapter Quiz* 110 #8 *Reading Math* 98 *Study Guide and Review* 134 2-3

STANDARDS		PAGE REFERENCES
	L4.3 Proof	
L4.3.1	Know the basic structure for the proof of an "If..., then..." statement (assuming the hypothesis and ending with the conclusion) and that proving the contrapositive is equivalent.	**Student Edition:** 93, 94 Example 4, 95 #9-#10, 96 #46 *Study Guide and Review* 132
L4.3.2	Construct proofs by contradiction. Use counterexamples, when appropriate, to disprove a statement.	**Student Edition:** 47 #38, 79 Example 3, 80 #5-#6, 81 #25-#30, #37, 82 #38 *Mid-Chapter Quiz* 110 #1-#2 *Study Guide and Review* 133 2-1
L4.3.3	Explain the difference between a necessary and a sufficient condition within the statement of a theorem. Determine the correct conclusions based on interpreting a theorem in which necessary or sufficient conditions in the theorem or hypothesis are satisfied.	**Student Edition:** 106-107, 125-128, 150, 173 *Reading Math* 190
	STANDARD G1: FIGURES AND THEIR PROPERTIES	
	G1.1 Lines and Angles; Basic Euclidean and Coordinate Geometry	
G1.1.1	Solve multistep problems and construct proofs involving vertical angles, linear pairs of angles, supplementary angles, complementary angles, and right angles.	**Student Edition:** 40-47, 124-131 *Geometry Lab* 41 *Review Vocabulary* 149 *Standardized Test Practice* 139 #12 *Study Guide and Review* 136 2-8
G1.1.2	Solve multistep problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.	**Student Edition:** 144-147, 149-153, 172-174 *Geometry Software Lab* 148 *Study Guide and Review* 194 3-5
G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.	**Student Edition:** *Construction* 25, 33, 35, 225, 228, 234 *Geometry Lab* 266-268, 597-598
G1.1.4	Given a line and a point, construct a line through the point that is parallel to the original line using straightedge and compass. Given a line and a point, construct a line through the point that is perpendicular to the original line. Justify the steps of the constructions.	**Student Edition:** *Geometry Lab* 48 *Geometry Software Lab* 148

STANDARDS		PAGE REFERENCES
G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.	**Student Edition:** 21-28, 38 #49-#51 *Construction* 25 *Study Guide and Review* 70 1-3
G1.1.6	Recognize Euclidean geometry as an axiom system. Know the key axioms and understand the meaning of and distinguish between undefined terms (e.g., point, line, and plane), axioms, definitions, and theorems.	**Student Edition:** 105-106, 109 #25, 327 *Geometry Lab* 188
	G1.2 Triangles and Their Properties	
G1.2.1	Prove that the angle sum of a triangle is 180° and that an exterior angle of a triangle is the sum of the two remote interior angles.	**Student Edition:** 202, 210-213, 215 #35, 216 #37 *Geometry Lab* 209 *Key Concepts* 256 Lesson 4-2
G1.2.2	Construct and justify arguments and solve multistep problems involving angle measure, side length, perimeter, and area of all types of triangles.	**Student Edition:** 19 #43-#44, 51, 53 Example 4, 56 #39, #45-#48, 202-205, 286 #45-#47, 296-300, 415-422, 639 *Geometry Lab* 282, 638 *Graphing Calculator Lab* 295
G1.2.3	Know a proof of the Pythagorean Theorem and use the Pythagorean Theorem and its converse to solve multistep problems.	**Student Edition:** 21-22, 52, 112 Example 2, 440-446, 448, 450, 537-538 Example 5, 590 Example 2, 701 Example 2 *Geometry Lab* 30, 439
G1.2.4	Prove and use the relationships among the side lengths and the angles of 30º- 60º- 90º triangles and 45º- 45º- 90º triangles.	**Student Edition:** 448-453, 462 #62-#53, 652 Example 3, 658-659 Standardized Test Example, 667 Example 3 *Study Guide and Review* 488 8-3
G1.2.5	Solve multistep problems and construct proofs about the properties of medians, altitudes perpendicular bisectors to the sides of a triangle, and the angle bisectors of a triangle. Using a straightedge and compass, construct these lines.	**Student Edition:** 269-278, 286 #44, 416-418, 434-436 *Geometry Lab* 266-268 *Geometry Software Lab* 433 *Study Tip* 639

STANDARDS		PAGE REFERENCES
G1.3 Triangles and Trigonometry		
G1.3.1	Define the sine, cosine, and tangent of acute angles in a right triangle as ratios of sides. Solve problems about angles, side lengths, or areas using trigonometric ratios in right triangles.	**Student Edition:** 456-462, 464-469 *Foldables Study Organizer* 486 Trigonometry *Graphing Calculator Lab* 455 *Mid-Chapter Quiz* 463 #10-#16 *Study Guide and Review* 489 8-4
G1.3.2	Know and use the Law of Sines and the Law of Cosines and use them to solve problems. Find the area of a triangle with sides *a* and *b* and included angle θ using the formula Area = (1/2) *a b* sin θ.	**Student Edition:** 471-476, 479-484, 646 *Foldables Study Organizer* 486 Laws of Sines and Cosines *Geometry Software Lab* 478 *Study Guide and Review* 489 8-6, 490 8-7
G1.3.3	Determine the exact values of sine, cosine, and tangent for 0°, 30°, 45°, 60°, and their integer multiples and apply in various contexts.	**Student Edition:** 460 #4, #6-#7, 481 Example 4
G1.4 Quadrilaterals and Their Properties		
G1.4.1	Solve multistep problems and construct proofs involving angle measure, side length, diagonal length, perimeter, and area of squares, rectangles, parallelograms, kites, and trapezoids.	**Student Edition:** 51, 52 #3, 53#3, 55 #12, #14, #17, #19, #25-#30, 56 #31-#32, #35-#36, #41-#44, 327-328, 334-335, 340-345, 348-354, 356, 369, 630-636, 639-647 *Geometry Lab* 355
G1.4.2	Solve multistep problems and construct proofs involving quadrilaterals (e.g., prove that the diagonals of a rhombus are perpendicular) using Euclidean methods or coordinate geometry.	**Student Edition:** 50-57, 318-319, 325-329, 333-338, 340-346, 348-353, 356-361, 363-367 *Graphing Calculator Lab* 332
G1.4.3	Describe and justify hierarchical relationships among quadrilaterals (e.g., every rectangle is a parallelogram).	**Student Edition:** 318, 348, 356 *Geometry Lab* 320 *Reading Math* 331, 664
G1.4.4	Prove theorems about the interior and exterior angle sums of a quadrilateral.	**Student Edition:** 318-323, 330 #46-#49, 339 #45-#48 *Spreadsheet Lab* 324

STANDARDS		PAGE REFERENCES
	G1.5 Other Polygons and Their Properties	
G1.5.1	Know and use subdivision or circumscription methods to find areas of polygons (e.g., regular octagon, nonregular pentagon).	**Student Edition:** 658-662, 671 #35-#36 *Practice Test* 675 #5, #9-#10 *Study Guide and Review* 674 11-4
G1.5.2	Know, justify, and use formulas for the perimeter and area of a regular *n*-gon and formulas to find interior and exterior angles of a regular *n*-gon and their sums.	**Student Edition:** 318-323, 330 #46-#49, 339 #45-#48 *Spreadsheet Lab* 324
	G1.6 Circles and Their Properties	
G1.6.1	Solve multistep problems involving circumference and area of circles.	**Student Edition:** 51, 54-56, 556-560, 569 #58-#61, 652-655, 706 *Geometry Lab* 651 *Study Guide and Review* 621 10-1
G1.6.2	Solve problems and justify arguments about chords (e.g., if a line through the center of a circle is perpendicular to a chord, it bisects the chord) and lines tangent to circles (e.g., a line tangent to a circle is perpendicular to the radius drawn to the point of tangency).	**Student Edition:** 554, 557-559, 570-577, 586 #48-#50, 607-608, 610-612, 667
G1.6.3	Solve problems and justify arguments about central angles, inscribed angles, and triangles in circles.	**Student Edition:** 563, 567-568, 607-608, 610-612, 666-668 *Study Guide and Review* 672
G1.6.4	Know and use properties of arcs and sectors and find lengths of arcs and areas of sectors.	**Student Edition:** 564-568, 570, 666-668, 706, 711 *Study Guide and Review* 620
	G1.8 Three-dimensional Figures	
G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	**Student Edition:** 62-65, 686-690, 693-696, 699-705, 706-710, 711-716 *Study Guide and Review* 72, 720-722
G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	**Student Edition:** 60-61, 682-684

STANDARDS		PAGE REFERENCES
STANDARD G2: RELATIONSHIPS BETWEEN FIGURES		
G2.1 Relationships Between Area and Volume Formulas		
G2.1.1	Know and demonstrate the relationships between the area formula of a triangle, the area formula of a parallelogram, and the area formula of a trapezoid.	**Student Edition:** 51-57, 630-636, 638-647, 649-655, 667 *Geometry Lab* 648 *Graphing Calculator Lab* 637
G2.1.2	Know and demonstrate the relationships between the area formulas of various quadrilaterals (e.g., explain how to find the area of a trapezoid based on the areas of parallelograms and triangles).	**Student Edition:** 658-662, 671 #35-#36 *Practice Test* 675 #5, #9-#10 *Study Guide and Review* 674 11-4
G2.1.3	Know and use the relationship between the volumes of pyramids and prisms (of equal base and height) and cones and cylinders (of equal base and height).	**Student Edition:** 62-65 #30
G2.2 Relationships Between Two-dimensional and Three-dimensional Representations		
G2.2.1	Identify or sketch a possible three-dimensional figure, given two-dimensional views (e.g., nets, multiple views). Create a two-dimensional representation of a three-dimensional figure.	**Student Edition:** 680-684, 686, 693, 700, 706 *Geometry Lab* 67
G2.2.2	Identify or sketch cross sections of three-dimensional figures. Identify or sketch solids formed by revolving two-dimensional figures around lines.	**Student Edition:** 61-62, 681-683, 758, 760-764
G2.3 Congruence and Similarity		
G2.3.1	Prove that triangles are congruent using the SSS, SAS, ASA, and AAS criteria and that right triangles are congruent using the hypotenuse-leg criterion.	**Student Edition:** 225-231, 234-240 *Geometry Lab* 242-243 *Study Guide and Review* 258 4-4, 259 4-5
G2.3.2	Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.	**Student Edition:** 217-223, 232 #33-#35, 241 #31-#32 *Study Guide and Review* 258 4-3
G2.3.3	Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.	**Student Edition:** 389-395, 397-403, 414 #56-#59 *Study Guide and Review* 425 Example 2, 426 7-3

STANDARDS		PAGE REFERENCES
G2.3.4	Use theorems about similar triangles to solve problems with and without use of coordinates.	**Student Edition:** 389-395, 397-403, 414 #56-#59 *Study Guide and Review* 425 Example 2, 426 7-3, 7-4
G2.3.5	Know and apply the theorem stating that the effect of a scale factor of k relating one two-dimensional figure to another or one three-dimensional figure to another, on the length, area, and volume of the figures is to multiply each by k, k^2, and k^3, respectively.	**Student Edition:** 390, 750, 753-757 *Spreadsheet Investigation* 752 *Vocabulary Check* 765 #5
	G3.1 Distance-preserving Transformations: Isometries	
G3.1.1	Define reflection, rotation, translation, and glide reflection and find the image of a figure under a given isometry.	**Student Edition:** 497, 504-505, 510 *Foldables Study Organizer* 543 Reflections, Translations, and Rotations *Geometry Lab* 496
G3.1.2	Given two figures that are images of each other under an isometry, find the isometry and describe it completely.	**Student Edition:** 497-503, 504-508, 510-516 *Foldables Study Organizer* 543 Reflections, Translations, and Rotations *Geometry Lab* 496 *Study Guide and Review* 544, 545 9-3
G3.1.3	Find the image of a figure under the composition of two or more isometries and determine whether the resulting figure is a reflection, rotation, translation, or glide reflection image of the original figure.	**Student Edition:** 498-503, 504-508, 510-516, 541 #67-#71 *Geometry Lab* 496 #1-#9 *Study Guide and Review* 544, 545 9-3
	G3.2 Shape-preserving Transformations: Dilations and Isometries	
G3.2.1	Know the definition of dilation and find the image of a figure under a given dilation.	**Student Edition:** 525-531, 541 #61-#64, 546 *Foldables Study Organizer* 543 Dilations *Geometry Lab* 496 *Study Guide and Review* 546 9-5
G3.2.2	Given two figures that are images of each other under some dilation, identify the center and magnitude of the dilation.	**Student Edition:** 525-531 *Study Guide and Review* 546 9-5