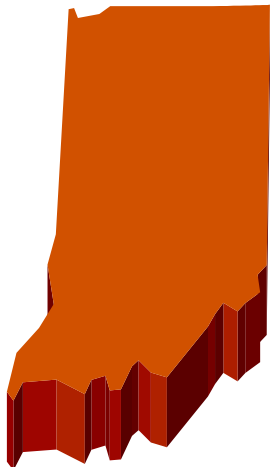
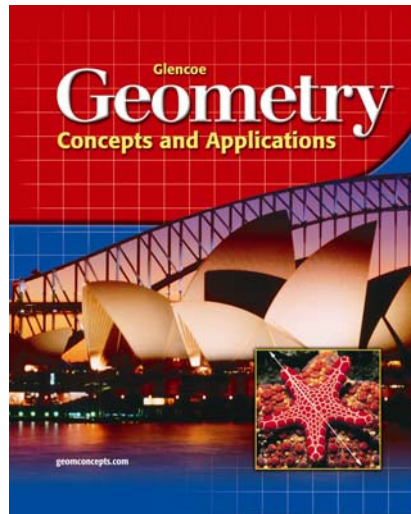


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**Indiana
Academic Mathematics Standards
Geometry**

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**INDIANA ACADEMIC MATHEMATICS STANDARDS
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OBJECTIVES	PAGE REFERENCES
Standard 1	
Points, Lines, Angles, and Planes	
<i>Students find lengths and midpoints of lines. They describe and use parallel and perpendicular lines. They find slopes and equations of lines.</i>	
G.1.1 Find the lengths and midpoints of line segments in one- or two-dimensional coordinate systems.	SE 63–67, 73, 76–81, 82–85, 101, 375, 393 TWE: 63–67, 73, 76–81, 82–85, 101, 375, 393
G.1.2 Construct congruent segments and angles, angle bisectors, and parallel and perpendicular lines using a straight edge and compass, explaining and justifying the process used.	SE 64–65, 67, 107–108, 162, 237, 244, 245, 281, 381, 474 TWE: 64–65, 67, 107–108, 162, 237, 244, 245, 281, 381, 474
G.1.3 Understand and use the relationships between special pairs of angles formed by parallel lines and transversals.	SE 141, 148–153, 156–164, 167, 181, 323, 376, 382–384, 640, 646, 667 TWE: 141, 148–153, 156–164, 167, 181, 323, 376, 382–384, 640, 646, 667
G.1.4 Use coordinate geometry to find slopes, parallel lines, perpendicular lines, and equations of lines.	SE 168–175, 176, 179, 182, 192, 197, 233, 239, 492, 563 TWE: 168–175, 176, 179, 182, 192, 197, 233, 239, 492, 563
Standard 2	
Polygons	
<i>Students identify and describe polygons, and measure interior and exterior angles. They use congruence, similarity, symmetry, tessellations, and transformations. They find measures of sides, perimeters, and areas.</i>	
G.2.1 Identify and describe convex, concave, and regular polygons.	SE 404–406, 408–411, 418, 440–441, 446 TWE: 404–406, 408–411, 418, 440–441, 446

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OBJECTIVES	PAGE REFERENCES
G.2.2 Find measures of interior and exterior angles of polygons, justifying the method used.	SE 282–285, 408–412 TWE: 282–285, 408–412
G.2.3 Use properties of congruent and similar polygons to solve problems.	SE 356–357, 359–361, 364, 366, 369, 375–379, 395, 397, 413, 432 TWE: 356–357, 359–361, 364, 366, 369, 375–379, 395, 397, 413, 432
G.2.4 Apply transformations (slides, flips, turns, expansions, and contractions) to polygons in order to determine congruence, similarity, symmetry, and tessellations. Know that images formed by slides, flips and turns are congruent to the original shape.	This objective is addressed throughout the text. See, for example: SE 198–202, 205, 221, 295, 407, 441, 443, 692–696, 697–702, 708–709, 712–713, 715 TWE: 198–202, 205, 221, 295, 407, 441, 443, 692–696, 697–702, 708–709, 712–713, 715
G.2.5 Find and use measures of sides, perimeters, and areas of polygons, and relate these measures to each other using formulas.	SE 35–39, 388–390, 413–415, 425–426, 427–430, 432–433, 438 TWE: 35–39, 388–390, 413–415, 425–426, 427–430, 432–433, 438
G.2.6 Use coordinate geometry to prove properties of polygons such as regularity, congruence, and similarity.	SE 661–665, 670–671 TWE: 661–665, 670–671
Standard 3	
Quadrilaterals	
<i>Students identify and describe simple quadrilaterals. They use congruence and similarity. They find measures of sides, perimeters, and areas.</i>	
G.3.1 Describe, classify, and understand relationships among the quadrilaterals square, rectangle, rhombus, parallelogram, trapezoid, and kite.	SE 310–315, 316–319, 322–326, 327–332, 333–336, 338, 342–345 TWE: 310–315, 316–319, 322–326, 327–332, 333–336, 338, 342–345

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OBJECTIVES	PAGE REFERENCES
G.3.2 Use properties of congruent and similar quadrilaterals to solve problems involving lengths and areas.	SE 36–40, 44–45, 114, 420–424, 434, 447, 449, 482, 521, 605, 648 TWE: 36–40, 44–45, 114, 420–424, 434, 447, 449, 482, 521, 605, 648
G.3.3 Find and use measures of sides, perimeters, and areas of quadrilaterals, and relate these measures to each other using formulas.	SE 36–40, 44–45, 114, 420–424, 434, 447, 449, 482, 521, 605, 648 TWE: 36–40, 44–45, 114, 420–424, 434, 447, 449, 482, 521, 605, 648
G.3.4 Use coordinate geometry to prove properties of quadrilaterals such as regularity, congruence, and similarity.	SE 661–665, 670–671 TWE: 661–665, 670–671
Standard 4	
Triangles	
<i>Students identify and describe types of triangles. They identify and draw altitudes, medians, and angle bisectors. They use congruence and similarity. They find measures of sides, perimeters, and areas. They apply inequality theorems.</i>	
G.4.1 Identify and describe triangles that are right, acute, obtuse, scalene, isosceles, equilateral, and equiangular.	SE 188–189, 191, 194–197, 249, 266, 323, 450, 468, 561, 587, 636, 641, 644 TWE: 188–189, 191, 194–197, 249, 266, 323, 450, 468, 561, 587, 636, 641, 644
G.4.2 Define, identify, and construct altitudes, medians, angle bisectors, and perpendicular bisectors.	SE 65, 107–108, 228, 234–235, 237, 245, 281, 381, 474 TWE: 65, 107–108, 228, 234–235, 237, 245, 281, 381, 474
G.4.3 Construct triangles congruent to given triangles.	SE 208, 209, 210 TWE: 208, 209, 210

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OBJECTIVES	PAGE REFERENCES
G.4.4 Use properties of congruent and similar triangles to solve problems involving lengths and areas.	SE 203–219, 221–223, 251–255, 269, 271, 388–393, 395–397, 419–420, 422–424, 430, 439, 447, 449, 660–665, 669, 677 TWE: 203–219, 221–223, 251–255, 269, 271, 388–393, 395–397, 419–420, 422–424, 430, 439, 447, 449, 660–665, 669, 677
G.4.5 Prove and apply theorems involving segments divided proportionally.	SE 368–371, 374–376, 382–387 TWE: 368–371, 374–376, 382–387
G.4.6 Prove that triangles are congruent or similar and use the concept of corresponding parts of congruent triangles.	SE 203–207, 210–214, 215–220, 252–254, 267, 269, 271, 323, 325, 468, 645, 655–656, 658 TWE: 203–207, 210–214, 215–220, 252–254, 267, 269, 271, 323, 325, 468, 645, 655–656, 658
G.4.7 Find and use measures of sides, perimeters, and areas of triangles, and relate these measures to each other using formulas.	SE 419–420, 423, 425, 427, 430, 439, 446–447 TWE: 419–420, 423, 425, 427, 430, 439, 446–447
G.4.8 Prove, understand, and apply the inequality theorems: triangle inequality, inequality in one triangle, and hinge theorem.	SE 290–295, 296–300, 303–305, 315 TWE: 290–295, 296–300, 303–305, 315
G.4.9 Use coordinate geometry to prove properties of triangles such as regularity, congruence, and similarity.	SE 664–665, 671 TWE: 664–665, 671

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OBJECTIVES	PAGE REFERENCES
Standard 5	
Right Triangles	
<i>Students prove the Pythagorean Theorem and use it to solve problems. They define and apply the trigonometric relations sine, cosine, and tangent.</i>	
G.5.1 Prove and use the Pythagorean Theorem.	SE 226–227, 256–259, 268, 270, 292, 432–433, 470, 506, 519, 524, 554, 557, 559, 577, 593–594, 617, 628 TWE: 226–227, 256–259, 268, 270, 292, 388, 432–433, 470, 506, 519, 524, 554, 557, 559, 577, 593–594, 617, 628
G.5.2 State and apply the relationships that exist when the altitude is drawn to the hypotenuse of a right triangle.	The opportunity to address this objective is available. See the following: SE 362–367 TWE: 362–367
G.5.3 Use special right triangles ($30^\circ - 60^\circ$ and $45^\circ - 45^\circ$) to solve problems.	SE 554–556, 559–562, 576, 579, 628 TWE: 554–556, 559–562, 576, 579, 628
G.5.4 Define and use the trigonometric functions (sine, cosine, tangent, cosecant, secant, cotangent) in terms of angles of right triangles.	SE 564–569, 571–577, 580–581, 628, 657, 673 TWE: 564–569, 571–577, 580–581, 628, 657, 673
G.5.5 Know and use the relationship $\sin^2 x + \cos^2 x = 1$.	SE 577 TWE: 577
G.5.6 Solve word problems involving right triangles.	SE 261, 265, 270, 292, 554–555, 557, 577, 593–594, 617, 628 TWE: 261, 265, 270, 292, 554–555, 557, 577, 593–594, 617, 628

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OBJECTIVES	PAGE REFERENCES
Standard 6	
Circles	
<i>Students define ideas related to circles: e.g., radius, tangent. They find measures of angles, lengths, and areas. They prove theorems about circles. They find equations of circles.</i>	
G.6.1 Find the center of a given circle. Construct the circle that passes through three given points (not in a straight line).	SE 425, 454–455, 459, 528, 622, 626, 637 TWE: 425, 454–455, 459, 528, 622, 626, 637
G.6.2 Define and identify relationships among: radius, diameter, arc, measure of an arc, chord, secant, and tangent.	SE 454, 462–467, 484–486, 489, 490, 544, 585, 598, 606–607, 609 TWE: 454, 462–467, 484–486, 489, 490, 544, 585, 598, 606–607, 609
G.6.3 Prove theorems related to circles.	SE 638, 658 TWE: 638, 658
G.6.4 Construct tangents to circles, and circumscribe and inscribe circles.	SE 474, 476, 489, 593, 597 TWE: 474, 476, 489, 593, 597
G.6.5 Define, find, and use measures of arcs and related angles (central, inscribed, and intersections of secants and tangents).	SE 462–467, 484–486, 489, 490, 544, 585, 598, 606–607, 609 TWE: 462–467, 484–486, 489, 490, 544, 585, 598, 606–607, 609
G.6.6 Define and identify congruent and concentric circles.	SE 456–458, 462, 464, 482, 497 TWE: 456–458, 462, 464, 482, 497

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OBJECTIVES	PAGE REFERENCES
G.6.7 Define, find, and use measures of circumference, arc length, and areas of circles and sectors. Use these measures to solve problems.	SE 453, 463–473, 478–487, 489, 490–491, 506, 518, 544, 582, 591, 605, 611, 625 TWE: 453, 463–473, 478–487, 489, 490–491, 506, 518, 544, 582, 591, 605, 611, 625
G.6.8 Find the equation of a circle in the coordinate plane in terms of its center and radius.	SE 618–622 TWE: 618–622
Standard 7	
Polyhedra and Other Solids	
<i>Students describe and make polyhedra and other solids. They describe relationships and symmetries, and use congruence and similarity.</i>	
G.7.1 Describe and make regular and non-regular polyhedra.	SE 496–498, 500–501, 504–505, 511, 516–517, 522–523, 540, 543 TWE: 496–498, 500–501, 504–505, 511, 516–517, 522–523, 540, 543
G.7.2 Describe the polyhedron that can be made from a given net (or pattern). Describe the net for a given polyhedron.	SE 504, 506, 509, 522 TWE: 504, 506, 509, 522
G.7.3 Describe relationships between the faces, edges, and vertices of polyhedra.	SE 496–497, 499–501, 540 TWE: 496–497, 499–501, 540
G.7.4 Describe symmetries of geometric solids.	The opportunity to address this objective is available. See the following: SE 496–497, 499–501, 540 TWE: 496–497, 499–501, 540
G.7.5 Describe sets of points on spheres: chords, tangents, and great circles.	SE 154–155, 528–529, 542–543 TWE: 154–155, 528–529, 542–543

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OBJECTIVES	PAGE REFERENCES
G.7.6 Identify and know properties of congruent and similar solids.	SE 534–536, 537–539 TWE: 534–536, 537–539
G.7.7 Find and use measures of sides, volumes of solids, and surface areas of solids, and relate these measures to each other using formulas.	SE 352, 495, 510–515, 522–527, 529–533, 535–536, 538–539, 541–543 TWE: 352, 495, 510–515, 522–527, 529–533, 535–536, 538–539, 541–543
Standard 8	
Mathematical Reasoning and Problem Solving	
<i>Students use a variety of strategies to solve problems.</i>	
G.8.1 Use a variety of problem-solving strategies, such as drawing a diagram, making a chart, guess-and-check, solving a simpler problem, writing an equation, and working backwards.	This objective is addressed throughout. See, for example: SE 7–11, 89, 187, 227, 272, 275, 309, 349, 401, 453, 547, 585, 631, 645 TWE: 7–11, 89, 187, 227, 272, 275, 309, 349, 401, 453, 547, 585, 631, 645
G.8.2 Decide whether a solution is reasonable in the context of the original situation.	The opportunity to address this objective is available. See the following: SE 7–11, 89, 187, 227, 272, 275, 309, 349, 401, 453, 547, 585, 631, 645 TWE: 7–11, 89, 187, 227, 272, 275, 309, 349, 401, 453, 547, 585, 631, 645
<i>Students develop and evaluate mathematical arguments and proofs.</i>	

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OBJECTIVES	PAGE REFERENCES
G.8.3 Make conjectures about geometric ideas. Distinguish between information that supports a conjecture and proof of a conjecture.	SE 6–9, 17, 33, 65, 193, 317, 458, 638–643, 655–659, 662, 664, 667, 670–671 TWE: 6–9, 17, 33, 65, 193, 317, 458, 638–643, 655–659, 662, 664, 667, 670–671
G.8.4 Write and interpret statements of the form “if – then” and “if and only if.”	SE 6–9, 17, 33, 65, 193, 317, 458, 638–643, 655–659, 662, 664, 667, 670–671 TWE: 6–9, 17, 33, 65, 193, 317, 458, 638–643, 655–659, 662, 664, 667, 670–671
G.8.5 State, use, and examine the validity of the converse, inverse, and contrapositive of “if – then” statements.	SE 28, 632–633, 635, 636–637 TWE: 28, 632–633, 635, 636–637
G.8.6 Identify and give examples of undefined terms, axioms, and theorems, and inductive and deductive proof.	SE 644–648, 649–659, 660–665, 666–667, 669–671, 686, 702, 762–769 TWE: 644–648, 649–659, 660–665, 666–667, 669–671, 686, 702, 762–769
G.8.7 Construct logical arguments, judge their validity, and give counterexamples to disprove statements.	SE 6, 8, 9, 17, 25, 44–45, 209, 281, 638 TWE: 6, 8, 9, 17, 25, 44–45, 209, 281, 638
G.8.8 Write geometric proofs, including proofs by contradiction and proofs involving coordinate geometry. Use and compare a variety of ways to present deductive proofs, such as flow chart, paragraph, two-column, and indirect.	SE 644–648, 649–659, 660–665, 666–667, 669–671, 686, 702 TWE: 644–648, 649–659, 660–665, 666–667, 669–671, 686, 702

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OBJECTIVES	PAGE REFERENCES
G.8.9 Perform basic constructions, describing and justifying the procedures used. Distinguish between constructing and drawing geometric figures.	SE 64–65, 67, 107–108, 162, 237, 244, 245, 281, 381, 474 TWE: 64–65, 67, 107–108, 162, 237, 244, 245, 281, 381, 474

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