



Geometry

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**Michigan
Edition**

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: 357-363, 364-370, 525 #1 <i>Geometry Activity</i> 524	Teacher Wraparound Edition: ICE 358, 359; TNT 524; TT 524; TTT 528
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: 498-505, 516 #35-#41, 517 #22-#23	Teacher Wraparound Edition: A 505; DI 499; GA 501; ICE 499, 500, 501; TNT 501
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: 21 ex 2, 25 #24-#25, 359 ex 4, 361 #23, 363 #1-#2, 368 #22-#27	Teacher Wraparound Edition: A 19; DI 14; ICE 14, 22; TT 26

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: 730-731 <i>Study Tip</i> 14 Teacher Wraparound Edition: A 19; DI 14; ICE 14, 22; TT 26
L4.1 Mathematical Reasoning	
L4.1.1 Distinguish between inductive and deductive reasoning, identifying and providing examples of each.	Student Edition: 62-66, 74 #56-#61, 80 #58-#61, 82-87, 93 #35, 100 #40-#42, 115 #9-#11, 117 #25-#29, 121 #12 Teacher Wraparound Edition: A 66, 87; DI 64, 83; ICE 63, 83, 84
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: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70
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: 62-66, 80 #58-#61, 82-87, 89-93, 94-100, 101-106 Teacher Wraparound Edition: A 66, 93, 100; DI 90, 91, 96, 103; ICE 90, 91, 95, 96, 102, 103; TT 90
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: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70
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: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70

STANDARDS	PAGE REFERENCES
<p>L4.2.3 Use the quantifiers “there exists” and “all” in mathematical and everyday settings and know how to logically negate statements involving them.</p>	<p>Student Edition: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70</p>
<p>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.</p>	<p>Student Edition: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70</p>
<p>L4.3 Proof</p>	
<p>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.</p>	<p>Student Edition: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70</p>
<p>L4.3.2 Construct proofs by contradiction. Use counterexamples, when appropriate, to disprove a statement.</p>	<p>Student Edition: 62-66, 74 #56-#61, 80 #58-#61, 82-87, 93 #35, 100 #40-#42, 115 #9-#11, 117 #25-#29, 121 #12 Teacher Wraparound Edition: A 66, 87; DI 64, 83; ICE 63, 83, 84</p>
<p>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.</p>	<p>Student Edition: 67-74, 75-80, 87 #36-#38, 93 #36-#37, 100 #43-#46, 116 #12-#17 <i>Geometry Activity</i> 88 <i>Reading Mathematics</i> 81 Teacher Wraparound Edition: A 74; DI 71, 77; ICE 69, 77; TNT 70</p>

STANDARDS		PAGE REFERENCES
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.	<p>Student Edition: 37-43, 50 #40-#41, 56 #38-#41, 107-114, 120 #55-#58, 123 #15</p> <p>Teacher Wraparound Edition: A 43, 114; CC 40; DI 39, 108; ICE 38, 41, 108, 109; TT 40</p>
G1.1.2	Solve multistep problems and construct proofs involving corresponding angles, alternate interior angles, alternate exterior angles, and same-side (consecutive) interior angles.	<p>Student Edition: 37-43, 50 #40-#41, 56 #38-#41, 107-114, 120 #55-#58, 123 #15</p> <p>Teacher Wraparound Edition: A 43, 114; CC 40; DI 39, 108; ICE 38, 41, 108, 109; TT 40</p>
G1.1.3	Perform and justify constructions, including midpoint of a line segment and bisector of an angle, using straightedge and compass.	<p>Student Edition: <i>Construction</i> 24, 32, 33, 44, 151, 237, 311, 314, 425, 433, 444, 541, 542, 554, 556, 560, 577</p>
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.	<p>Student Edition: <i>Geometry Activity</i> 44 <i>Construction</i> 151</p>
G1.1.5	Given a line segment in terms of its endpoints in the coordinate plane, determine its length and midpoint.	<p>Student Edition: 36 #52-#54, 43 #50-#55, 55 #20-#27, 57 #21-#22, 59 #13</p> <p><i>Geometry Activity</i> 28</p> <p>Teacher Wraparound Edition: A 27; DI 23, 24; ICE 22, 23; TT 24</p>
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.	<p>Student Edition: 62-66, 80 #58-#61, 82-87, 89-93, 94-100, 101-106</p> <p>Teacher Wraparound Edition: A 66, 93, 100; DI 90, 91, 96, 103; ICE 90, 91, 95, 96, 102, 103; TT 90</p>

STANDARDS	PAGE REFERENCES
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: 185-191, 198 #40-#42, 228 #12-#14, 231 #7-#9, 233 #12 <i>Geometry Activity</i> 184 Teacher Wraparound Edition: A 191; DI 186, 189; ICE 186, 187, 188
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: 185-191, 198 #40-#42, 228 #12-#14, 231 #7-#9, 233 #12, 364-370, 371-376, 377-383, 385-390 <i>Geometry Activity</i> 184 <i>Geometry Software Investigation</i> 384 Teacher Wraparound Edition: A 191, 370, 383; DI 186, 189, 366, 372, 378, 380; ICE 186, 187, 188; TT 365
G1.2.3 Know a proof of the Pythagorean Theorem and use the Pythagorean Theorem and its converse to solve multistep problems.	Student Edition: 350-356, 363 #45-#50, 370 #72-#75, 393 #13-#15, 397 #10-#12 Teacher Wraparound Edition: A 356; BPK 351; DI 352, 353; H 350, 364; ICE 351, 352
G1.2.4 Prove and use the relationships among the side lengths and the angles of 30° - 60° - 90° triangles and 45° - 45° - 90° triangles.	Student Edition: 357-363, 370 #69-#71, 376 #36-#38, 394 #16-#20, 397 #3 Teacher Wraparound Edition: A 363; DI 358, 359; ICE 358, 359; TNT 358
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: 238-245, 254 #57-#59, 260 #39-#41, 274 #8-#10, 277 #4-#6, 278 #7 <i>Geometry Activity</i> 236, 237 <i>Reading Mathematics</i> 246 Teacher Wraparound Edition: A 245; DI 240; ICE 240, 241; TNT 239; TT 239
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: 364-370, 371-376, 377-383, 385-390 <i>Geometry Software Investigation</i> 384 Teacher Wraparound Edition: A 370, 383; DI 366, 372, 378, 380; ICE 365, 366, 372, 378, 379, 386, 387; TT 365

STANDARDS	PAGE REFERENCES
<p>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 $\text{Area} = (1/2) a b \sin \theta$.</p>	<p>Student Edition: 377-383, 385-390, 396 #31-#40, 397 #20-#22 <i>Geometry Software Investigation</i> 384 Teacher Wraparound Edition: A 383, 390; CC 387; DI 378, 380, 386; ICE 378, 379, 386, 387; TT 386</p>
<p>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.</p>	<p>Student Edition: 364-370, 371-376, 377-383, 385-390 <i>Geometry Software Investigation</i> 384 Teacher Wraparound Edition: A 370, 383; DI 366, 372, 378, 380; ICE 365, 366, 372, 378, 379, 386, 387; TT 365</p>
<p>G1.4 Quadrilaterals and Their Properties</p>	
<p>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.</p>	<p>Student Edition: 411-416, 417-423, 424-430, 431-437 <i>Geometry Activity</i> 438 Teacher Wraparound Edition: A 416, 430, 437; DI 413, 419, 426; ICE 412, 413, 418, 419, 420, 425, 432, 433; TT 413, 418</p>
<p>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.</p>	<p>Student Edition: 411-416, 417-423, 424-430, 431-437 <i>Geometry Activity</i> 438 Teacher Wraparound Edition: A 416, 430, 437; DI 413, 419, 426; ICE 412, 413, 418, 419, 420, 425, 432, 433; TT 413, 418</p>
<p>G1.4.3 Describe and justify hierarchical relationships among quadrilaterals (e.g., every rectangle is a parallelogram).</p>	<p>Student Edition: 435 #26-#31 <i>Reading Mathematics</i> 446 Teacher Wraparound Edition: DI 433, 434; GS 446; T 446</p>
<p>G1.4.4 Prove theorems about the interior and exterior angle sums of a quadrilateral.</p>	<p>Student Edition: 404-409 <i>Spreadsheet Investigation</i> 410 Teacher Wraparound Edition: A 409; DI 407; GA 406; ICE 405, 406; TTT 405</p>

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: 610-616, 621 #32-#34, 627 #37-#39, 629 #15-#16 Teacher Wraparound Edition: A 616; BPK 611; CC 613; DI 612; ICE 611, 612	
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: 404-409, 416 #52-#55, 423 #51-#56, 457 #20, 610-616, 621 #32-#34, 627 #37-#39, 629 #15-#16 <i>Spreadsheet Investigation</i> 410 Teacher Wraparound Edition: A 616; BPK 611; CC 613; DI 612; ICE 611, 612	
G1.6 Circles and Their Properties		
G1.6.1 Solve multistep problems involving circumference and area of circles.	Student Edition: 522-528, 535 #59-#62, 581 #11-#16, 587 #3, 610-616 Teacher Wraparound Edition: A 528, 616; DI 525; GA 524; ICE 523, 524, 525, 612; TNT 524	
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: 536-543, 552-558, 561-568 Teacher Wraparound Edition: A 543, 558, 568; DI 537, 554; ICE 537, 538, 539, 553, 554, 555, 562, 563, 564; TT 538, 553	
G1.6.3 Solve problems and justify arguments about central angles, inscribed angles, and triangles in circles.	Student Edition: 529-535, 544-551 <i>Geometry Activity</i> 559-560 Teacher Wraparound Edition: A 535, 551; DI 531, 532, 546; ICE 530, 531, 532, 545, 546, 547; TT 532	
G1.6.4 Know and use properties of arcs and sectors and find lengths of arcs and areas of sectors.	Student Edition: 529-535, 544-551 <i>Geometry Activity</i> 559-560 Teacher Wraparound Edition: A 535, 551; DI 531, 532, 546; ICE 530, 531, 532, 545, 546, 547; TT 532	

STANDARDS		PAGE REFERENCES
G1.8 Three-dimensional Figures		
G1.8.1	Solve multistep problems involving surface area and volume of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	<p>Student Edition: 643-648, 649-654, 655-659, 660-665, 666-670, 671-676</p> <p>Teacher Wraparound Edition: A 654, 659, 668; CC 651; DI 651; ICE 650, 651, 656, 661, 662, 667, 672, 673; TT 661; TTT 650</p>
G1.8.2	Identify symmetries of pyramids, prisms, cones, cylinders, hemispheres, and spheres.	<p>Student Edition: 639 ex 3, 640 #25-#27, 641 #28-#30</p> <p>Teacher Wraparound Edition: ICE 639</p>
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.	<p>Student Edition: 598 #1</p> <p><i>Geometry Activity</i> 595, 601</p> <p>Teacher Wraparound Edition: A 609; GA 596, 602; TNT 602; TT 603</p>
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).	<p>Student Edition: 601-609, 621 #35-#37, 627 #37-#38, 628 #7-#12, 629 #13-#14, 631 #4-#7</p> <p>Teacher Wraparound Edition: ICE 602, 603, 604</p>
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).	<p>Student Edition: 688-694, 696-701, 706 #38-#39, 713 #49-#51, 720 #11-#13, 721 #14-#16, 723 #7-#10</p> <p><i>Spreadsheet Investigation</i> 695</p> <p>Teacher Wraparound Edition: GA 689; ICE 689, 690, 691, 697, 698</p>
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.	<p>Student Edition: 636-642, 643-648, 649, 654 #47-#48, 655, 659 #35-#36, 660, 666</p> <p>Teacher Wraparound Edition: A 648; DI 644; ICE 637, 644, 645; TT 637, 644, 645</p>

STANDARDS	PAGE REFERENCES
<p>G2.2.2 Identify or sketch cross sections of three-dimensional figures. Identify or sketch solids formed by revolving two-dimensional figures around lines.</p>	<p>Student Edition: 639 ex 3, 640 #25-#27, 641 #28-#30</p> <p>Teacher Wraparound Edition: ICE 639</p>
<p>G2.3 Congruence and Similarity</p>	
<p>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.</p>	<p>Student Edition: 200-206, 207-213, 221 #44-#45, 229 #18-#21</p> <p><i>Geometry Activity</i> 214-215</p> <p>Teacher Wraparound Edition: A 206, 213; DI 201; GA 208; ICE 201, 202, 208, 209; TT 201</p>
<p>G2.3.2 Use theorems about congruent triangles to prove additional theorems and solve problems, with and without use of coordinates.</p>	<p>Student Edition: 200-206, 207-213, 221 #44-#45, 229 #18-#21</p> <p><i>Geometry Activity</i> 214-215</p> <p>Teacher Wraparound Edition: A 206, 213; DI 201; GA 208; ICE 201, 202, 208, 209; TT 201</p>
<p>G2.3.3 Prove that triangles are similar by using SSS, SAS, and AA conditions for similarity.</p>	<p>Student Edition: 298-306, 315 #49-#51, 334 #22-#26, 337 #10-#12</p> <p>Teacher Wraparound Edition: DI 319; TNT 210; TT 299</p>
<p>G2.3.4 Use theorems about similar triangles to solve problems with and without use of coordinates.</p>	<p>Student Edition: 298-306, 315 #49-#51, 316-323, 331 #48-#51, 334 #22-#26, 336 #35-#38, 337 #10-#12</p> <p>Teacher Wraparound Edition: A 306; DI 300, 318, 319; ICE 299, 300, 317, 318; TNT 210; TT 299</p>
<p>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.</p>	<p>Student Edition: 608 #53-#55, 615 #49-#54, 647 #37, 653 #30-#33, 675 #36, 698 #1, 707-713</p> <p><i>Spreadsheet Investigation</i> 695</p> <p>Teacher Wraparound Edition: A 695, 713; DI 709; ICE 708, 709</p>

STANDARDS	PAGE REFERENCES
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: 463-469, 470-475, 476-482, 488 #42-#45, 497 #60-#61, 506-511, 513 #9-#14, 514 #15-#20 <i>Geometry Activity</i> 462 Teacher Wraparound Edition: A 469, 475, 482; DI 465, 466, 473; ICE 463, 464, 471, 507, 508
G3.1.2 Given two figures that are images of each other under an isometry, find the isometry and describe it completely.	Student Edition: 468 #41, 471 ex 2, 475 #38 Teacher Wraparound Edition: ICE 471
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: 468 #38-#39, 471 ex 3, 472 #9-#11, 478 ex 2, 479 #5-#6, 482 #47-#49, 509 #12, 510 #39-#42, 516 #46-#47, 517 #10-#12 <i>Geometry Investigation</i> 477 Teacher Wraparound Edition: DI 509; ICE 472, 478; TT 472
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: 490-497, 505 #62-#65, 511 #53, 515 #27-#34, 517 #16-#21, 519 #12 Teacher Wraparound Edition: A 497; CC 491; ICE 491, 492, 493; TT 491
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: 490-497, 505 #62-#65, 511 #53, 515 #27-#34, 517 #16-#21, 519 #12 Teacher Wraparound Edition: A 497; CC 491; ICE 491, 492, 493; TT 491