

Nevada Intuitive Geometry to CORD Geometry, 2nd Edition

INTUITIVE GEOMETRY

Course Scope:

This one-year course in geometry is designed to present all of the geometric concepts in an investigative and application-oriented format. A logical, deductive system of reasoning is developed intuitively and informally. Geometric properties and concepts are applied to a variety of applications. This course is designed to provide an alternative to the traditional high school geometry course. Algebra I or Applied Algebra is a recommended prerequisite. A calculator and appropriate computer software are necessary tools for successful completion of this course. This course will fulfill one of the mathematics credits required for graduation.

Course Goals:

1. To analyze geometric problems and arrive at a conclusion based on intuitive, inductive, or deductive logical processes.
2. To formulate and solve real-world problems incorporating geometric models and applying the properties of figures.
3. To investigate and sketch plane figures and solid objects.
4. To compare and contrast geometric properties of plane and solid figures.
5. To apply the concepts of congruence, similarity, and proportion to a variety of problems.
6. To formulate and validate formulas for two-dimensional figures and three-dimensional objects.
7. To perform constructions in order to discover and validate mathematical assertions.
8. To investigate and apply the principles of transformational geometry to problem solving.
9. To establish a correspondence between algebraic and geometric concepts.
10. To study lines and line segments in the coordinate plane in order to validate properties of geometric figures.
11. To construct geometric proofs including indirect and paragraph formats.
12. To use technology, including computer software and calculators, to extend problem-solving strategies.
13. To reason and communicate mathematically in order to apply learned concepts to new problem-solving situations.
14. To exhibit increased confidence in mathematical abilities that encourage continued participation in higher-level mathematics classes.
15. To broaden the ability to use inquiry skills.

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1. **Investigations and Problem-Solving**

These skills may be taught as a separate unit, but must be integrated throughout each unit of study where appropriate.

1.1 The student will express information from an application problem in a different format.

Location or Pages: Application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

1.2 The student will select an appropriate strategy for solving an application problem.

Examples:

- a. Create diagrams or sketches.
- b. Use trial and error or guess and check.
- c. Make a table or chart.
- d. Work a simpler problem and generalize.
- e. Look for a pattern.
- f. Model the problem using physical models.
- g. Use an equation or formula.
- h. Use logical reasoning.
- i. Work backwards.

Location or Pages: Application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

1.3 The student will develop a plan for solving an application problem.

One four-step plan is as follows:

- a. Read the problem carefully, identifying the information sought and the facts provided.
- b. Devise a plan of action (strategy) to reach a solution.
- c. Carry out the plan.

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- d. Check to see that the solution works and write-up the answer using complete sentences.

Location or Pages: 41, 100, 214, 338, 474, 608

- 1.4 The student will compare strategies for solving a given problem.

Location or Pages: See Problem Solving: Using a Four-Step Plan pages 41, 100, 214, 338, 474, 608. In addition, application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

- 1.5 The student will estimate the range of reasonable answers for a given problem.

Location or Pages: See Problem Solving: Using a Four-Step Plan pages 41, 100, 214, 338, 474, 608. In addition, application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

- 1.6 The student will select the best tool for solving a given problem: computer, calculator, pencil-paper, estimation, or mental math.

Location or Pages: See Problem Solving: Using a Four-Step Plan pages 41, 100, 214, 338, 474, 608. In addition, application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

- 1.7 The student will explore geometric or algebraic relationships using patterns.

Location or Pages: 41, 68-73, 84

- 1.8 The student will develop a model of a given problem.

Location or Pages: See Problem Solving: Using a Four-Step Plan pages 41, 100, 214, 338, 474, 608. See the "Activity" features found in each lesson. In addition, application problems

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are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.

- 1.9 The student will justify the reasonableness of his/her solution to an application problem.
- Location or Pages:** See Problem Solving: Using a Four-Step Plan pages 41, 100, 214, 338, 474, 608. In addition, application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.
- 1.10 The student will formulate real-world problems.
- Location or Pages:** Models for real-world problems can be found in the "Workplace Communication" feature found on pages 182, 351, 435, 462, 561. In addition, real-world application problems are found in the following features: "Think and Discuss", "Practice and Problem Solving", and "Mixed Review" at the end of each lesson; "Math Applications" and "Chapter Assessment" at the end of each chapter.
- 1.11 The student will solve process problems in other disciplines or various career/occupational areas.
- Location or Pages:** See the Table of Contents for a correlation of the text to various career/occupational areas
- 1.12 The student will create new problem-solving situations.
- Location or Pages:** This is a teacher driven objective rather than textbook driven.
- 1.13 The student will develop strategies for different types of assessments: true/false, multiple-choice, essay.
- Location or Pages:** This is a teacher driven objective rather than textbook driven.

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1.14 The student will design a learning plan.
Location or Pages: This is a teacher driven objective rather than textbook driven.

1.15 The student will develop note-taking strategies.
Location or Pages: This is a teacher driven objective rather than textbook driven.

1.16 The student will organize a notebook for this class.
Location or Pages: This is a teacher driven objective rather than textbook driven.

2. **The Language of Geometry**

2.1 The student will explore geometry in nature, history, art, and cultures around the world.

Location or Pages: See "Cultural Connection" feature on page 28, 111, 167, 270, 426, 545, 690

2.2 The student will compare the characteristics of figures and solids.

Location or Pages: 4-9, 20, 22, 24, 29, 30, 31, 102, 110, 141, 145, 147, 163, 260, 271, 607, 654. See also the activities found in each lesson that provide opportunities for students to become active learners by interacting with the text to learn how a concept works..

2.3 The student will interrelate visual models with geometric symbols and terms.

Location or Pages: This is a teacher driven objective rather than textbook driven.

2.4 The student will explore attributes of geometric figures.

Location or Pages: 186-187, 291-292, 369-371, 501-503

2.5 The student will develop estimation skills using geometric tools.

Location or Pages: With modifications, the figures on the following pages can be used: 24, 28, 35, 37, 206, 215, 276-277, 322, 359, 390

2.6 The student will develop accuracy using geometric tools.

Location or Pages: 12-18, 19-26, 35, 44-45, 51-63, 294-296, 310, 323, 367-369, 550-551, 681, 683, 716-718

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3. Reasoning and Logical Thinking

- 3.1 The student will distinguish between the hypothesis and conclusion of an implication.
Location or Pages: 74-79, 80-84, 89-94, 154, 161
- 3.2 The student will compare the converse, inverse, and contrapositive of a conditional statement.
Location or Pages: 80-84, 125, 126, 127, 132, 136, 154, 366
- 3.3 The student will validate a conditional statement and its converse, inverse, or contrapositive.
Location or Pages: 84, 126, 127, 132, 366
- 3.4 The student will propose a conclusion from given information.
Location or Pages: 68-73; also the students are given the opportunity to draw conclusions in many of the activities in the lessons and Math Labs at the end of each chapter. See for example, pages 23, 32, 44-45, 105, 120-121, 122, 149, 163, 172, 231, 239-241, 262, 281, 291-292, 318, 349, 415, 483, 542, 605, 699, 708
- 3.5 The student will compose examples of deductive reasoning in real-world situations.
Location or Pages: This is a teacher driven objective rather than textbook driven.
- 3.6 The student will compose examples of inductive reasoning.
Location or Pages: This is a teacher driven objective rather than textbook driven.
- 3.7 The student will compare deductive and inductive arguments.
Location or Pages: 79, 123-124, 132, 136, 194, 198
- 3.8 The student will defend a conclusion using deductive reasoning.
Location or Pages: 74-79
- 3.9 The student will defend a conclusion using inductive reasoning.
Location or Pages: 68-73
- 3.10 The student will construct an indirect or paragraph proof.
Location or Pages: 91-92, 97, 98, 104, 109, 158, 173-178, 194, 197, 200, 220-221, 222, 224, 227, 230, 232, 233, 275, 344, 350, 404, 422, 424, 540

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3.11 The student will complete the steps in a two-column proof.

Location or Pages: 94, 98, 102, 105, 108, 109, 113, 114, 136, 147, 157, 160, 186-187, 229, 274, 278, 280, 286, 315, 326, 329, 342, 408, 423, 437, 464, 472, 480, 531, 547, 551, 556

4. **Lines and Angles**

4.1 The student will distinguish among the various terms associated with an angle.

Location or Pages: 8, 10, 26, 40

4.2 The student will classify angles.

- | | |
|-------------|------------------|
| a. Acute | e. Adjacent |
| b. Obtuse | f. Complementary |
| c. Right | g. Supplementary |
| d. Vertical | |

Location or Pages: 19-25, 26-29, 35, 43, 64, 75, 79, 88

4.3 The student will sketch examples of each given class of angles.

Location or Pages: 26, 64

4.4 The student will differentiate between complementary and supplementary angles.

Location or Pages: 43, 64, 88

4.5 The student will explore conditions which guarantee parallelism or angle congruency.

- Congruent alternate interior angles.
- Congruent alternate exterior angles.
- Congruent corresponding angles.
- Supplementary interior angles on the same side of the transversal.

Location or Pages: 33-34, 44-45, 65, 148-154, 155-161, 184-186, 192-193, 197, 200-201, 210, 212, 220, 223, 230, 284, 497-499, 563, 680

4.6 The student will differentiate among parallel, perpendicular, intersecting, and skew lines.

Location or Pages: 30-34, 140-147, 190, 200, 290, TE 597

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- 4.7 The student will solve problems using postulates and theorems related to parallel or perpendicular lines.

Location or Pages: 30-35, 110-114, 137, 148-154, 155-162, 190, 199, 200, 210, 223, 230, 284, 287-290, 326-330, 414-420, 421-422, 428, 453, 454, 497-499, 563, 588, 680

- 4.8 The student will construct geometric figures involving lines and angles.

Location or Pages: 36-46, 48-50, 53, 59, 61, 64, 65, 68, 73, 94, 109, 147, 155, 178, 207, 211, 223, 234, 235, 237-238, 249, 267, 278, 281, 285, 286, 319, 320, 323-325, 327, 335, 343, 428, 531, 536, 546, 571, 669, 704

5. Polygons and Circles

- 5.1 The student will classify polygons.

Location or Pages: 162-164, 168, 268-272, 273-278, 279-284, 285-290, 293-294, 294-296, 303-307, 322, 353, 420, 453

- 5.2 The student will classify a triangle according to its angles or sides.

Location or Pages: 162-164, 168

- 5.3 The student will recognize the relationships between sides and angles of a triangle.

Location or Pages: 179-183, 188-189, 192, 193, 195, 200, 201, 236, 595, 611, 727

- 5.4 The student will verify that three given sides form a triangle.

Location or Pages: 179-183, 200, 595, 611, 727

- 5.5 The student will explore the properties of inequality among parts of a triangle.

Location or Pages: 171-178, 179-183, 188-189, 192, 193, 195, 200, 201, 236, 595, 611, 727

- 5.6 The student will interrelate the properties of quadrilaterals.

Location or Pages: 268-272, 273-278, 279-284, 285-290, 291-292, 293-294, 294-296, 297-307, 322, 453, 455, 461, 506, 588, 618, 636, 671

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- 5.7 The student will solve problems involving angles of a triangle.
Location or Pages: 162-170, 186-187, 188-189, 192, 196, 198, 200, 201, 210, 330, 470, 476, 588, 611, 631, 680, 696
- 5.8 The student will develop strategies for finding the measure of an interior angle of a given regular polygon.
Location or Pages: 262-264, 266-267, 269, 291-292, 297, 300, 304, 340, 360, 420, 476, 529
- 5.9 The student will justify conclusions to problems related to angle measure in triangles.
Location or Pages: 162-170, 186-187, 188-189, 192, 196, 198, 200, 201, 210, 330, 470, 476, 588, 611, 631, 680, 696
- 5.10 The student will solve problems involving the sum of the interior angles of a given polygon.
Location or Pages: 262-264, 266-267, 269, 291-292, 297, 300, 304, 340, 360, 420, 476, 529
- 5.11 The student will explore the relationships within a polygon.
Location or Pages: 501-503
- 5.12 The student will explore relationships within a circle.
Location or Pages: 481-482, 501-503
- 5.13 The student will compare the attributes among the various parts of a circle.
Example:
- | | |
|---------------------|-------------------|
| a. Center | g. Arc length |
| b. Radius | h. Central angles |
| c. Diameter | I. Tangents |
| d. Chord | j. Secants |
| e. Arc | k. Sectors |
| f. Inscribed angles | |
- Location or Pages:** 53, 481, 493, 525-532, 533-541, 542-549, 550-556, 565-567, 567-570, 571-579, 625, 697

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- 5.14 The student will develop strategies for solving problems relating to circles using algebraic techniques.
Location or Pages: 511, 518-524, 548-549, 556, 564-565, 579, 611
- 5.15 The student will justify mathematical assertions relating to circles.
Location or Pages: 481-484, 499-501, 501-503, 525, 528, 533-534, 536, 542, 543-544, 550-551, 552-553, 564-565, 565-567, 567-570
- 5.16 The student will formulate strategies for determining ratios relating to circles.
Location or Pages: 493-495, 529, 534-541, 545, 550-556, 571, 576, 577
- 5.17 The student will develop strategies for solving real-world problems applying the properties of a circle.
Location or Pages: 481-486, 493-495, 506, 508, 511-512, 513, 514-515, 518-524, 525-532, 533-541, 542-549, 550-556, 557-563, 571-579, 599-604, 605-611, 619-625, 626-631, 650-663
- 5.18 The student will construct polygons.
Location or Pages: 43, 48-50, 55, 61, 178, 207, 211, 223, 231, 267, 278, 281, 285-286, 319-320, 323, 324-325, 335, 343, 546, 669
- 5.19 The student will construct geometric figures relating to circles.
Location or Pages: 531, 536, 546
- 5.20 The student will solve real-world problems using the relationships within a polygon or a circle.
Location or Pages: 481-482, 501-503
6. **Congruence, Similarity, and Right Triangles**
- 6.1 The student will develop strategies for solving proportions.
Location or Pages: 65, 102, 269, 310-315, 318, 321, 323-330, 331-334, 335-340, 348-353, 354-360, 361-366, 367-369, 371-372, 373-387, 424, 464, 487-491, 603, 632-636, 660, 662, 705

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- 6.2 The student will differentiate between similar and congruent polygons.
Location or Pages: Congruent figures are covered on pages 36-37 and similar polygons are covered on pages 316-317. The instructor will need another resource to provide illustrations to follow the suggestion in the objective.
- 6.3 The student will differentiate between congruent and similar triangles.
Location or Pages: Congruent triangles are covered on Lessons 4.1, 4.2, and 4.4. Similar triangles are covered on Lessons 6.2 and 6.3. The instructor will need another resource to provide illustrations to follow the suggestion in the objective.
- 6.4 The student will solve problems using the corresponding parts of congruent triangles.
Location or Pages: 205, 208, 218-223, 224-230, 231-236, 239-241, 242-253, 541, 611, 687
- 6.5 The student will solve problems using the theorems and postulates for congruence.
Include SSS, SAS, ASA, and AAS.
Location or Pages: 204-210, 211-217, 218-223, 224-230, 231-236, 237-241, 242-252, 272, 315, 376, 379-380, 396, 496, 541, 611, 687
- 6.6 The student will compute the missing lengths of sides of similar triangles or other polygons.
Location or Pages: 243, 245, 252, 302, 316-322, 323-330, 331-334, 335-340, 348-353, 354-360, 361-366, 367-369, 371-372, 373-387, 424, 487-491, 512, 524, 541, 603, 617, 618, 625, 641, 718-720
- 6.7 The student will justify the similarity of pairs of triangles or other polygons.
Include AA, SSS, and SAS similarity.
Location or Pages: 316-322, 323-330, 335-340, 367-369, 375, 386, 424, 470, 487-491, 524, 625, 641

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- 6.8 The student will solve application problems using the similarity theorems.
Location or Pages: 243, 245, 252, 302, 316-322, 323-330, 331-334, 335-340, 348-353, 354-360, 361-366, 367-369, 371-372, 373-387, 424, 487-491, 512, 524, 541, 603, 617, 618, 625, 641, 718-720
- 6.9 The student will develop strategies for solving problems using the triangle proportionality theorem.
Location or Pages: 326-330, 371-372, 387, 512, 656
- 6.10 The student will explore right triangles and their relationships.
Location or Pages: 341-347, 348-353, 354-360, 361-366, 369-371, 375, 376, 377, 378, 380, 381, 383, 384, 385-387, 391, 396, 407, 411, 448, 451, 473, 474, 478, 491, 496, 504, 505, 512, 532, 537, 545, 576, 577, 631, 653, 656, 711, 718-720
- 6.11 The student will solve real-world problems using the Pythagorean theorem and its converse.
Location or Pages: 341-347, 360, 369-371, 376, 378, 381, 385-387, 391, 407, 411, 473, 474, 504, 512, 537, 545, 576, 631, 653, 656
- 6.12 The student will explore relationships between sides of special right triangles.
Location or Pages: 348-353, 369-371, 376, 377, 383, 385, 387, 396, 448, 451, 478, 505, 532, 577, 711
- 6.13 The student will compute lengths of sides in special right triangles.
Location or Pages: 348-353, 369-371, 376, 377, 383, 385, 387, 396, 448, 451, 478, 505, 532, 577, 711
- 6.14 The student will determine the trigonometric ratios for a right triangle.
Location or Pages: 354-360, 361-366, 375, 380, 384, 386, 387, 491, 496, 718-720
- 6.15 The student will solve real-world problems using trigonometric ratios.
Location or Pages: 354-360, 361-366, 375, 380, 384, 386, 387, 491, 496, 718-720

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7. **Perimeters, Area, and Volume**

7.1 The student will develop strategies for finding the perimeter of various polygons.

Location or Pages: 259-261, 289, 300, 318, 321, 328, 330, 352, 461, 469, 470, 476, 479, 480, 501-503, 513, 528, 573, 613-614, 618, 711

7.2 The student will develop strategies for finding the area of various polygons.

Location or Pages:
458-464, 465-470, 471-476, 477-480, 487-491, 497-499, 504-515, 529, 541, 545, 549, 556, 595, 596-604, 612-614, 617, 631, 650-662, 673, 693, 711

7.3 The student will sketch solid figures.

Location or Pages: 582-588, 589-595, 643-646, 657, 663

7.4 The student will explore relationships among the parts of solid figures.

Location or Pages: 596-604, 605-611, 612-618, 619-625, 626-631, 632-636, 637-641, 647-649, 654

7.5 The student will develop strategies for finding the surface area of basic solid figures.

Location or Pages: 596-604, 612-615, 617-618, 619-620, 622-624, 626-627, 629-631, 637-641, 650-663, 673, 693

7.6 The student will develop strategies for finding the volume of basic solid figures.

Location or Pages: 605-611, 615-618, 620-624, 627-631, 632-636, 650-663

8. **Plane Coordinate Geometry**

8.1 The student will formulate strategies for determining the distance between two points.

Location or Pages: 390-396, 421-428, 436, 444-455, 469, 506, 636

8.2 The student will formulate strategies for determining the slope of a line.

Location or Pages: 406-412, 438-439, 439-441, 444-455

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- 8.3 The student will formulate strategies for determining the midpoint of a segment.
Location or Pages: 390-396, 421-428, 444-455, 549
- 8.4 The student will compare the attributes of parallel and perpendicular lines in a coordinate system.
Location or Pages: 142, 414-416, 439-441
- 8.5 The student will formulate strategies for graphing linear equations.
Location or Pages: 413-420, 438-439, 444-455
- 8.6 The student will formulate strategies for writing the equation of a line given data about that line.
Location or Pages: 413-420, 438-439, 444-455, 496, 563, 588, 631, 680
- 8.7 The student will justify conjectures using coordinate geometry techniques.
Location or Pages: 415, 421-428

9. **Transformational Geometry**

- 9.1 The student will distinguish among the basic mapping functions: rotation, reflection, and translation.
Location or Pages: 666-673, 674-680, 681-687, 698-704
- 9.2 The student will explore relationships among the basic transformations.
Location or Pages: 666-673, 674-680, 681-687, 698-704
- 9.3 The student will design examples of each type of symmetry.
Location or Pages: 670-673
- 9.4 The student will sketch the results after two or more transformations are applied to a figure.
Location or Pages: 688-693, 694-697, 703-704, 722, 723
- 9.5 The student will explore tessellations of a plane using regular or irregular polygons.
Location or Pages: 694-697, 722, 729