



# monarch

Curriculum Catalog

Geometry

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## Geometry Course Overview

Geometry is a full year, high school math course for the student who has successfully completed the prerequisite course, Algebra I. The course focuses on the skills and methods of linear, coordinate, and plane geometry. In it, students will gain solid experience with geometric calculations and coordinate plane graphing, methods of formal proof, and techniques of construction.

- **Introduction:** Student will solve problems using set theory and operations, identify characteristics of postulates and relate geometric theorems on points, lines, and planes
- **Logic:** Student will use inductive reasoning to draw reasonable conclusions, or deductive reasoning to prove basic theorems, and write conditional statements, converses, inverses and contrapositives.
- **Angles and Parallels:** Student will identify types of angles, categorize a shape as a polygon or non-polygon, identify different kinds of polygons, and find angle measures of polygons
- **Congruent Triangles and Quadrilaterals:** Student will identify corresponding parts of congruent triangles, prove congruent parts using different theorems and postulates, and solve for angle measures of congruent polygons.
- **Similar Polygons:** Student will use facts about similarity to calculate side and angle measures in similar polygons, and use sine, cosine, and tangent values to solve for missing values in triangles.
- **Circles:** Student will identify different parts of a circle, and angles and arcs created by different lines interacting with circles and calculate their measures.
- **Area and Volume:** Student will calculate the area, surface area, and volume of varying polygons by breaking them down into smaller and recognizable shapes.
- **Coordinate Geometry:** Student will graph linear equations and inequalities, use the distance and mid-point formulas to find lengths of segments and perimeters of geometric shapes, and find the equation of a line in various ways.
- **Transformations:** Student will understand rotations, reflections, dilations and translations in terms of angles, circles, perpendicular lines, and line segments, and find the result of combining multiple transformations.

Unit 1: Introduction		
Assignments		
Geometry	1. Course Overview	11. Geometric Postulates
	2. Mathematic System: Set Theory Review	12. Review of Algebraic Postulates
	3. Mathematic System: Operations with Sets	13. Geometric Theorems
	4. Quiz 1: Set Theory	14. Review of Properties of Algebra
	5. Geometry Undefined Terms: Point	15. Quiz 4: Postulates and Theorems
	6. Geometry Undefined Terms: Line	16. Special Project*
	7. Geometry Undefined Terms: Plane	17. Test
	8. Quiz 2: Undefined Terms	18. Alternate Test*
	9. Defined Terms: Definitions	19. Glossary and Credits
	10. Quiz 3: Defined Terms	

Unit 2: Logic	
Assignments	
Geometry	1. Logic
	2. Conjunctions
	3. Disjunctions
	4. Negation
	5. Conditional or Implication Statements
	6. Converse, Inverse, Contrapositive
	7. Quiz 1: Principles of Logic
	8. Inductive Reasoning
	9. Deductive Reasoning
	10. Using Deductive Reasoning
	11. Quiz 2: Inductive and Deductive Reasoning
	12. Proof Formats: Statement of the Theorem
	13. Proof Formats: The Figure
	14. Proof Formats: The Given Statement
	15. Proof Formats: To Prove Statement
	16. Proof Formats: The Plan of the Proof
	17. Indirect Proof Format: The Paragraph Proof
	18. Quiz 3: Proof Formats
	19. Special Project*
	20. Test
	21. Alternate Test*
	22. Glossary and Credits

Unit 3: Angles and Parallels		
Assignments		
Geometry	1. Angle Definitions	15. Quiz 3: Parallels and Transversals
	2. Angle Measurement	16. Construction: Perpendiculars
	3. Quiz 1: Angles	17. Construction: Tangents to Circles
	4. Angle Relationship Definitions	18. Construction: Parallels
	5. Angle Relationship Theorems (1)	19. Classifying Triangles by Sides and Angles
	6. Angle Relationship Theorems (2)	20. Exterior and Remote Interior Angles of a Triangle
	7. Quiz 2: Angle Theorems	21. Proofs Involving Triangles
	8. Construction: Copying Figures	22. Other Polygons
	9. Construction: Bisecting Figures	23. Quiz 4: Triangles, Polygons, and Angle Properties
	10. Basic Properties of Parallels	24. Special Project*
	11. Transversals and Special Angles	25. Test
	12. More Proofs: Transversals and Special Angles	26. Alternate Test*
	13. Continued Proofs: Transversals and Special Angles	27. Glossary and Credits
	14. More Proofs for Postulates 9 and 10	

Unit 4: Congruent Triangles and Quadrilaterals		
Assignments		
Geometry	1. Defining Congruent Triangles	16. Inequality Theorem in One Triangle Part 2
	2. Proving Triangles Congruent (1)	17. Inequality Theorem in Two Triangles
	3. Proving Triangles Congruent (2)	18. Quadrilateral Parallelograms Theorems Part 1
	4. Proving Right Triangles Congruent	19. Quadrilateral Parallelograms Theorems Part 2
	5. Quiz 1: Congruent Triangles	20. Quiz 3: Inequalities; Quadrilaterals
	6. Independent Triangles (1)	21. Triangles that Use Parallelograms in Proofs
	7. Independent Triangles (2)	22. Parallelograms: Rectangles
	8. Overlapping Triangles (1)	23. Parallelograms: Rhombus
	9. Overlapping Triangles (2)	24. Trapezoids-Definitions and Proofs
	10. Isosceles Triangles (1)	25. Quiz 4: Parallelograms; Trapezoids
	11. Isosceles Triangles (2)	26. Special Project*
	12. Construction of Triangles 30-60-90	27. Test
	13. Construction of Triangles 45-45-90	28. Alternate Test*
	14. Quiz 2: Types of Triangles	29. Glossary and Credits
	15. Inequality Theorem in One Triangle Part 1	

Unit 5: Similar Polygons		
Assignments		
Geometry	1. Algebra and Ratios	15. Using Triangles: Rectangular Solids
	2. Algebra Properties and Proportions	16. Using Triangles: Regular Square Pyramid
	3. Properties of Proportions	17. Trigonometry-Sine Ratio
	4. Quiz 1: Ratios, Properties, and Proportions	18. Trigonometry-Cosine Ratio
	5. Meaning of Similarity	19. Trigonometry-Tangent Ratio
	6. Meaning of Similarity-Theorems	20. Using Similar Triangles in Indirect Measurement
	7. Meaning of Similarity-Proofs	21. Using Trigonometry in Indirect Measure
	8. Theorems-Similar Polygons	22. Quiz 3: Triangles and Trigonometry
	9. Theorems-Special Segments in Triangles	23. Project: Model and Scale Drawing
	10. Similar Right Triangles	24. Special Project*
	11. The Pythagorean Theorem	25. Test
	12. Theorem about 30-60-90 Right Triangles	26. Alternate Test*
	13. Theorem about 45-45-90 Right Triangles	27. Glossary and Credits
	14. Quiz 2: Similarity; Triangle Theorems	

Geometry	<b>Unit 6: Semester Review and Exam</b>	
	<b>Assignments</b>	
	1. Review	3. Alternate Exam - Form A*
	2. Exam	4. Alternate Exam - Form B*

Geometry	<b>Unit 7: Circles</b>	
	<b>Assignments</b>	
	1. Characteristics of Circles	11. Special Angles Type 2
	2. Characteristics of Spheres	12. Special Angles Type 3
	3. Quiz 1: Circles and Spheres	13. Special Segments
	4. Tangents	14. Quiz 3: Special Angles and Segments
	5. Arcs	15. Construction: Circles
	6. Chords	16. Special Project*
	7. Theorems (1)	17. Test
	8. Theorems (2)	18. Alternate Test*
	9. Quiz 2: Tangents, Arcs, and Chords	19. Glossary and Credits
10. Special Angles Type 1		

Geometry	<b>Unit 8: Area and Volume</b>	
	<b>Assignments</b>	
	1. Area Concepts of Polygons	15. Solids: Prisms
	2. Area of Rectangles	16. Solids: Pyramids
	3. Area of Parallelograms	17. Solids: Cylinders
	4. Area of Triangles and Rhombuses	18. Solids: Cones
	5. Area of Trapezoids	19. Solids: Spheres
	6. Area of Regular Polygons	20. Quiz 3: Volume of Solids
	7. Area Comparisons of Polygons	21. Construction: Dividing a Segment
	8. Quiz 1: Area of Polygons	22. Construction: 4th Proportion
	9. Construction: Polygons	23. Construction: The Geometric Mean
	10. Circles: Circumference and $\pi$	24. Special Project*
	11. Circles: Area of Circles	25. Test
	12. Circles: Area of Sectors	26. Alternate Test*
13. Circles: Area of Segments	27. Glossary and Credits	
14. Quiz 2: Area of Circles		

Geometry	<b>Unit 9: Coordinate Geometry</b>	
	<b>Assignments</b>	
	1. Symmetry	11. Equations of Lines
	2. Ordered Pairs: Points in a Plane	12. Quiz 3: Slope and Lines
	3. Graphs of Algebraic Sentences	13. Figures in the Coordinate Plane
	4. Quiz 1: Symmetry, Ordered Pairs, and Graphs	14. Proofs with Coordinate Geometry (1)
	5. Distance Formula	15. Proofs with Coordinate Geometry (2)
	6. Equation of a Circle	16. Quiz 4: Figures and Proofs
	7. Midpoint Formula	17. Special Project*
	8. Quiz 2: Distance Formula and Applications	18. Test
	9. Slope	19. Alternate Test*
10. Parallel and Perpendicular Lines	20. Glossary and Credits	

Unit 10: Transformations	
Assignments	
Geometry	1. Introduction: Rigid Motion, or Isometry
	2. Isometry: Reflection
	3. Isometry: Translation
	4. Isometry: Rotation
	5. Quiz 1: Isometry
	6. Dilation: Congruence and Similarity
	7. Product Transformation
8. Inverse and Identity Transformation	
9. Quiz 2: Transformations	
10. Special Project*	
11. Test	
12. Alternate Test*	
13. Glossary and Credits	

Unit 11: Review	
Assignments	
Geometry	1. Geometry as a System
	2. Geometry Proofs
	3. Angle Relationships and Parallels
	4. Quiz 1: Review: Units 1-3
	5. Congruent Triangles and Quadrilaterals
	6. Similar Polygons
	7. Circles
	8. Quiz 2: Review: Units 4,5,7
9. Area and Volume	
10. Coordinate Geometry	
11. Quiz 3: Review: Units 7,8,10	
12. Special Project*	
13. Test	
14. Alternate Test*	
15. Glossary and Credits	

Unit 12: Semester Review and Exam	
Assignments	
Geometry	1. Review
	2. Exam
3. Alternate Exam - Form A*	
4. Alternate Exam - Form B*	

Unit 13: Final Exam	
Assignments	
Geometry	1. Final Exam
	2. Alternate Exam - Form A*
3. Alternate Exam - Form B*	

(\*) Indicates alternative assignment