



2019-20

# CALVERT HOMESCHOOL™ 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, quadratic, 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.
- **Geometric Application:** Student will use the functions sine, cosine, and tangent, and the inverse trigonometric functions ( $\sin^{-1}$ ,  $\cos^{-1}$ , and  $\tan^{-1}$ ) to calculate unknown side lengths in right triangles, calculate densities, and use ratios to calculate unit scales.
- **Probability:** Student will determine the number of combinations, or permutations, in choosing elements from a set, explain the concept of conditional probability as found in everyday situations, and analyze decisions and strategies using probability concepts.

Unit 1: Introduction		
Assignments		
Geometry	1. Course Overview	12. Review of Algebraic Postulates
	2. Mathematic System: Set Theory Review	13. Geometric Theorems
	3. Mathematic System: Operations with Sets	14. Review of Properties of Algebra
	4. Quiz 1: Set Theory	15. Quiz 4: Postulates and Theorems
	5. Geometry Undefined Terms: Point	16. Performance Task
	6. Geometry Undefined Terms: Line	17. Alternate Performance Task*
	7. Geometry Undefined Terms: Plane	18. Special Project*
	8. Quiz 2: Undefined Terms	19. Test
	9. Defined Terms: Definitions	20. Alternate Test*
	10. Quiz 3: Defined Terms	21. Glossary and Credits
	11. Geometric Postulates	

Unit 2: Logic		
Assignments		
Geometry	1. Logic	13. Proof Formats: The Figure
	2. Conjunctions	14. Proof Formats: The Given Statement
	3. Disjunctions	15. Proof Formats: To Prove Statement
	4. Negation	16. Proof Formats: The Plan of the Proof
	5. Conditional or Implication Statements	17. Indirect Proof Format: The Paragraph Proof
	6. Converse, Inverse, Contrapositive	18. Quiz 3: Proof Formats
	7. Quiz 1: Principles of Logic	19. Performance Task
	8. Inductive Reasoning	20. Alternate Performance Task*
	9. Deductive Reasoning	21. Special Project*
	10. Using Deductive Reasoning	22. Test
	11. Quiz 2: Inductive and Deductive Reasoning	23. Alternate Test*
	12. Proof Formats: Statement of the Theorem	24. Glossary and Credits

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

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

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

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

Unit 7: Circles		
Assignments		
Geometry	1. Characteristics of Circles	12. Special Angles Type 3
	2. Characteristics of Spheres	13. Special Segments
	3. Quiz 1: Circles and Spheres	14. Quiz 3: Special Angles and Segments
	4. Tangents	15. Construction: Circles
	5. Arcs	16. Performance Task
	6. Chords	17. Alternate Performance Task*
	7. Theorems (1)	18. Special Project*
	8. Theorems (2)	19. Test
	9. Quiz 2: Tangents, Arcs, and Chords	20. Alternate Test*
	10. Special Angles Type 1	21. Glossary and Credits
	11. Special Angles Type 2	

Unit 8: Area and Volume		
Assignments		
Geometry	1. Area Concepts of Polygons	17. Solids: Cylinders
	2. Area of Rectangles	18. Solids: Cones
	3. Area of Parallelograms	19. Solids: Spheres
	4. Area of Triangles and Rhombuses	20. Quiz 3: Volume of Solids
	5. Area of Trapezoids	21. Two- and Three-Dimensional Shapes
	6. Area of Regular Polygons	22. Project: Rotating a Two Dimensional Shape
	7. Area Comparisons of Polygons	23. Geometric Probability
	8. Quiz 1: Area of Polygons	24. Construction: Dividing a Segment
	9. Construction: Polygons	25. Construction: 4th Proportion
	10. Circles: Circumference and PI	26. Construction: The Geometric Mean
	11. Circles: Area of Circles	27. Performance Task
	12. Circles: Area of Sectors	28. Alternate Performance Task*
	13. Circles: Area of Segments	29. Special Project*
	14. Quiz 2: Area of Circles	30. Test
	15. Solids: Prisms	31. Alternate Test*
	16. Solids: Pyramids	32. Glossary and Credits

Unit 9: Coordinate Geometry		
Assignments		
Geometry	1. Symmetry	13. Quiz 3: Slope and Lines
	2. Ordered Pairs: Points in a Plane	14. Figures in the Coordinate Plane
	3. Graphs of Algebraic Sentences	15. Proofs with Coordinate Geometry (1)
	4. Quiz 1: Symmetry, Ordered Pairs, and Graphs	16. Proofs with Coordinate Geometry (2)
	5. Distance Formula	17. Quiz 4: Figures and Proofs
	6. Perimeter and Area	18. Performance Task 2
	7. Equation of a Circle	19. Alternate Performance Task 2*
	8. Midpoint Formula	20. Special Project*
	9. Quiz 2: Distance Formula and Applications	21. Test
	10. Slope	22. Alternate Test*
	11. Parallel and Perpendicular Lines	23. Glossary and Credits
	12. Equations of Lines	

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. Transformation Sequences
	7. Similarity Transformation: Dilation
	8. Product Transformation
9. Inverse and Identity Transformation	
10. Quiz 2: Transformations	
11. Performance Task	
12. Alternate Performance Task*	
13. Special Project*	
14. Test	
15. Alternate Test*	
16. Glossary and Credits	

Unit 11: Geometric Application	
Assignments	
Geometry	1. Using SOH CAH TOA in Trigonometry
	2. Finding the Values of Trigonometric Functions
	3. Law of Sines
	4. Quiz 1: Sines
	5. Ambiguity and Area of a Triangle
	6. Law of Cosines: Finding a Side
	7. Law of Cosines: Finding an Angle
	8. Quiz 2: Cosines
9. Modeling with Geometric Figures	
10. Density	
11. Geometry in Design	
12. Quiz 3: Modeling Geometry	
13. Special Project*	
14. Test	
15. Alternate Test*	
16. Glossary and Credits	

Unit 12: Probability	
Assignments	
Geometry	1. Definitions, Sample Spaces, and Probability
	2. Addition of Probabilities
	3. Multiplication of Probabilities
	4. Quiz 1: Using Probability
	5. Definitions
	6. Permutations of N Things: Different
	7. Permutations of N things: Not All Different
	8. Combinations
	9. Quiz 2: Probability
10. Conditional Probability	
11. Conditional Probability in Real-World Situations	
12. Two-Way Frequency Tables	
13. Using Probability in Decision Making	
14. Quiz 3: Conditional Probability	
15. Special Project*	
16. Test	
17. Alternate Test*	
18. Glossary and Credits	

Unit 13: Semester Review and Exam	
Assignments	
Geometry	1. Review
	2. Exam
3. Alternate Exam - Form A*	
4. Alternate Exam - Form B*	

Unit 14: Final Exam	
Assignments	
Geometry	1. Final Exam
	2. Alternate Exam - Form A*
	3. Alternate Exam - Form B*
4. Performance Task 1	
5. Performance Task 2	

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Unit 15: End of Course Exam	
Assignments	
1. Exam	3. Alternate Exam - Form B*
2. Alternate Exam - Form A*	

(\*) Indicates alternative assignment