Geometry Fundamentals

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.

By the end of the course, students will be expected to do the following:

- Understand defined terms, axioms, postulates, and theories.
- Apply rules of formal logic and construct proofs in two-column format.
- Know how to solve for angles given parallels, perpendiculars, and transversals.
- Demonstrate how to solve for sides and angles of triangles, quadrilaterals, and polygons.
- Understand trigonometric ratios and know how to use them to solve for unknown sides and angles in given triangles as well as application word problems.
- Be able to determine arcs, chords, and sectors of circles.
- Calculate perimeter, area, and volume of figures and solids.
- Graph lines and determine slopes, midpoints, and distances.
- Make geometric constructions on paper.
- Represent results of motion geometry (translation, rotation, reflection, dilation).

Geometry Fundamentals

Unit 1: Introduction

Assignments

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

Geometry Fundamentals

Unit 2: Logic

Assignments

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

Geometry Fundamentals

Unit 3: Angles and Parallels

Assignments

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

Geometry Fundamentals

Unit 4: Congruent Triangles and Quadrilaterals

Assignments

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

Geometry Fundamentals

Unit 5: Similar Polygons

Assignments

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
16. Using Triangles: Regular Square Pyramid
17. Trigonometry-Sine Ratio
18. Trigonometry-Cosine Ratio
19. Trigonometry-Tangent Ratio
20. Using Similar Triangles in Indirect Measurement
21. Using Trigonometry in Indirect Measure
22. Quiz 3: Triangles and Trigonometry
23. Project: Model and Scale Drawing
24. Special Project*
25. Test
26. Alternate Test*
27. Glossary and Credits

Geometry

Unit 6: Semester Review and Exam

Assignments

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

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Unit 7: Circles

Assignments

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

Geometry

Unit 8: Area and Volume

Assignments

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

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Unit 9: Coordinate Geometry

Assignments

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

Fundamentals Geometry

Unit 10: Transformations

Assignments

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

Geometry

Unit 11: Review

Assignments

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

Geometry

Unit 12: Semester Review and Exam

Assignments

1. Review
2. Exam
3. Alternate Exam - Form A*
4. Alternate Exam - Form B*

Geometry

Unit 13: Final Exam

Assignments

1. Final Exam
2. Alternate Exam - Form A*
3. Alternate Exam - Form B*