

Knowre Math: **Geometry** Curriculum

Chapter 1 Basics of Geometry

| Lesson | Topic | VA MSL |
|---------------------------|--|---------------|
| 1-1 Undefined Terms | A) Points, Lines, and Planes | |
| | B) Line Segments | |
| | C) Rays | |
| 1-2 Segments | A) Distance | 4.10.a, G.4.a |
| | B) Segment Addition Postulate | |
| | C) Congruent Segments | |
| 1-3 Distance and Midpoint | A) Distance and the Distance Formula | G.3.a, G.4.b |
| | B) Midpoint and the Midpoint Formula | |
| | C) Segment Bisectors | |
| 1-4 Angles | A) Naming Angles | |
| | B) Measuring and Classifying Angles | |
| | C) Angle Addition Postulate | |
| 1-5 Angle Relationships | A) Complementary and Supplementary Angles | |
| | B) Linear Pairs and Vertical Angles | |
| | C) Angle Bisectors | |
| 1-6 Perimeter and Area | A) Perimeter of Squares, Rectangles, and Triangles | |
| | B) Area of Squares, Rectangles, and Triangles | |
| | C) Circumference and Area of Circles | |

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Chapter 2 Reasoning and Proof

| Lesson | Topic | VA MSL |
|--|---|---------------|
| 2-1 Conditional and Biconditional Statements | A) Conditional and Biconditional Statements | G.1.a, G.1.c |
| | B) Counterexamples | |
| | C) Inverses, Converses, and Contrapositives | |
| 2-2 Algebraic Proofs | A) Properties of Equality | |
| | B) Distributive Property | |
| | C) Algebraic Proof | |
| 2-3 Introduction to Geometric Proof | A) Properties of Segment Congruence | |
| | B) Properties of Angle Congruence | |
| | C) Proving Segments and Angles Congruent | |
| 2-4 Proof and Angle Relationships | A) Postulates and Theorems | G.2.a, G.2.b |
| | B) Right Angle and Vertical Angle Theorems | |
| | C) Congruent Complements and Supplements Theorems | |

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Chapter 3 Parallel and Perpendicular Lines

| Lesson | Topic | VA MSL |
|--|---|---------------------|
| 3-1 Parallel Lines and Transversals | A) Parallel and Skew Lines | G.4.g |
| | B) Transversals and Angle Relationships | |
| 3-2 Parallel Lines and Angle Pairs | A) Corresponding Angles Postulate | G.2.a, G.2.b |
| | B) Alternate Interior, Alternate Exterior, and Consecutive Interior Angles Theorems | |
| 3-3 Proving Lines Parallel | A) Converse of Corresponding Angles Postulate | G.2.a, G.2.b |
| | B) Converse of Alternate Interior, Alternate Exterior, and Consecutive Interior Angles Theorems | |
| 3-4 Parallel and Perpendicular Lines | A) Perpendicular Lines | G.2.a, G.2.b, G.4.c |
| | B) Parallel and Perpendicular Line Theorems | |
| | C) Perpendicular Bisectors | |
| 3-5 Equations of Lines | A) Slope | G.3.a |
| | B) Slope-Intercept Form | |
| | C) Point-Slope Form | |
| 3-6 Slopes of Parallel and Perpendicular Lines | A) Lines with Undefined and Zero Slope | G.3.a, G.3.b |
| | B) Slopes of Parallel and Perpendicular Lines | |
| | C) Equations of Parallel and Perpendicular Lines | |

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Chapter 4 Congruent Triangles

| Lesson | Topic | VA MSL |
|---|--|------------|
| 4-1 Angles of Triangles | A) Triangle-Angle Sum Theorem | G.1.c |
| | B) Interior and Exterior Angles of Triangles | |
| | C) Triangle Exterior Angle Theorem | |
| 4-2 Classifying Triangles | A) Triangle Notation | G.4.h |
| | B) Classifying Triangles by their Angles | |
| | C) Classifying Triangles by their Sides | |
| 4-3 Properties of Isosceles and Equilateral Triangles | A) Components of Isosceles Triangles | G.1.c |
| | B) Properties of Isosceles and Equilateral Triangles | |
| 4-4 Congruent Figures | A) Congruent Polygons | G.1.c, G.6 |
| | B) Congruence Statements | |
| | C) Third Angle Theorem and Corresponding Parts of Congruent Triangles | |
| 4-5 Proving Triangle Congruence | A) Side-Side-Side, Side-Angle-Side, and Angle-Side-Angle Congruence Postulates | G.1.c, G.6 |
| | B) Angle-Angle-Side and Hypotenuse-Leg Congruence Theorems | |
| | C) Identifying Reasons for Triangle Congruence | |

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Chapter 5 Relationships in Triangles

| Lesson | Topic | VA MSL |
|--|---|----------------------------|
| 5-1 Bisectors | A) Distance from a Point to a Line | G.2.a, G.2.b, G.4.b, G.4.e |
| | B) Angle Bisector Theorem and Its Converse | |
| | C) Perpendicular Bisector Theorem and Its Converse | |
| 5-2 Perpendicular and Angle Bisectors in Triangles | A) Perpendicular Bisectors of Triangles and Circumcenters | G.1.c, G.3.b, G.4.h |
| | B) Angle Bisectors of Triangles and Incenters | |
| 5-3 Medians and Altitudes in Triangles | A) Medians of Triangles and Centroids | G.1.c, G.3.b |
| | B) Altitudes of Triangles and Orthocenters | |
| 5-4 Angle-Side Relationships in Triangles | A) Using Side Lengths to Compare Interior Angle Measures | G.5.a, G.5.b |
| | B) Using Interior Angle Measures to Compare Side Lengths | |
| 5-5 Triangle Inequalities | A) Triangle Inequality Theorem | G.5.a, G.5.b |
| | B) Determining Possible Lengths of a Missing Side in a Triangle | |

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Chapter 6 Polygons and Quadrilaterals

| Lesson | Topic | VA MSL |
|--------------------------------------|--|------------------------|
| 6-1 Introduction to Polygons | A) Identifying and Naming Polygons | G.4.h |
| | B) Identifying Concave and Convex Polygons | |
| | C) Properties of Regular Polygons | |
| 6-2 Angles of Polygons | A) Sum of the Measures of the Interior Angles in Convex Polygons | G.10.a, G.10.b, G.10.c |
| | B) Sum of the Measures of the Exterior Angles of Convex Polygons | |
| | C) Measure of Each Interior and Exterior Angle in Regular Convex Polygons | |
| 6-3 Parallelograms | A) Definition of Parallelogram | G.9, G.10.b |
| | B) Opposite Sides and Angles of Parallelograms | |
| | C) Diagonals of Parallelograms | |
| 6-4 Test for Parallelograms | A) Using Opposite Sides, Opposite Angles, or Diagonals to Prove a Quadrilateral is a Parallelogram | G.9 |
| | B) Determining if Quadrilaterals are Parallelograms | |
| 6-5 Rectangles | A) Definition of Rectangle | G.9 |
| | B) Properties of Diagonals of Rectangles | |
| | C) Determining if a Parallelogram is a Rectangle | |
| 6-6 Rhombuses and Squares | A) Definition of Rhombus and Square | G.9 |
| | B) Properties of Rhombuses and Squares | |
| | C) Determining if a Parallelogram is a Rhombus or a Square | |
| 6-7 Trapezoids and their Midsegments | A) Definition of Trapezoid and Isosceles Trapezoid | G.9, G.10.b |
| | B) Base Angles and Diagonals of Isosceles Trapezoids | |
| | C) Midsegments of Trapezoids | |
| 6-8 Kites | A) Definition of Kite | G.9, G.10.b |
| | B) Diagonals of Kites | |
| | C) Opposite Angles in Kites | |

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Chapter 7 Transformations

| Lesson | Topic | VA MSL |
|--|--|--------------|
| 7-1 Transformation Notation and Translations | A) Transformation Notation | G.3.d |
| | B) Identifying Translations | |
| | C) Writing Translation Vectors as Translation Functions | |
| 7-2 Reflections | A) Reflecting in Horizontal and Vertical Lines | G.3.c, G.3.d |
| | B) Reflecting in $y=x$ and $y=-x$ | |
| | C) Determining a Line of Reflection | |
| 7-3 Symmetry and Rotations | A) Lines of Symmetry | G.3.c, G.3.d |
| | B) Rotational Symmetry | |
| | C) Rotating a Figure about a Point | |
| 7-4 Dilations | A) Dilation about a Point | G.3.d |
| | B) Determining if Transformations are Dilations | |
| | C) Dilation about the Origin | |
| 7-5 Composition of Isometries | A) Compositions of Reflections in Parallel or Intersecting Lines | G.3.d |
| | B) Glide Reflections | |
| | C) Performing and Identifying Compositions of Isometries | |

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Chapter 8 Similar Figures

| Lesson | Topic | VA MSL |
|------------------------------|--|--------|
| 8-1 Ratio and Proportion | A) Ratios and Proportions | |
| | B) Equivalent Proportions | |
| | C) Solving Proportions | |
| 8-2 Directed Line Segments | A) Ratios and Segments | |
| | B) Using Ratios of Segments to Determine Segment Length | |
| | C) Using Ratios of Segments to Determine the Coordinates of a Point on a Segment | |
| 8-3 Similar Polygons | A) Similarity and Proportionality Statements | |
| | B) Using Similarity Statements to Identify Corresponding Parts | |
| | C) Scale Factor | |
| 8-4 Similar Triangles | A) Angle-Angle Triangle Similarity Postulate | |
| | B) Side-Side-Side and Side-Angle-Side Similarity Theorems | |
| | C) Missing Measures in Similar Triangles | |
| 8-5 Proportions in Triangles | A) Parallel Lines and Proportional Segments | G.1.c |
| | B) Angle Bisectors and Proportional Segments | |
| 8-6 Midsegments of Triangles | A) Parallel Segments | G.1.c |
| | B) Length Relationships | |

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Chapter 9 Right Triangles and Trigonometry

| Lesson | Topic | VA MSL |
|--|---|--------------|
| 9-1 Right Triangle Similarity | A) Right Triangles and Proportionality Statements | G.1.c |
| | B) Missing Measures in Similar Right Triangles | |
| 9-2 Pythagorean Theorem and Pythagorean Inequalities | A) Pythagorean Theorem | G.1.c, G.8.a |
| | B) Pythagorean Triples | |
| | C) Pythagorean Inequalities | |
| 9-3 Isosceles Right Triangles | A) Determine the Length of the Hypotenuse from a Leg | G.8.b |
| | B) Determine the Length of a Leg from the Hypotenuse | |
| 9-4 30°-60°-90° Triangles | A) Determine the Length of the Long Leg and the Hypotenuse from the Short Leg | G.8.b |
| | B) Determine the Length of the Short Leg and the Long Leg from the Hypotenuse | |
| | C) Determine the Length of the Short Leg and the Hypotenuse from the Long Leg | |
| 9-5 Trigonometric Ratios | A) Sine, Cosine, and Tangent Ratios | |
| | B) Relationship Between the Sine and Cosine Ratios for Complementary Angles | |
| | C) Inverse Trigonometric Ratios | |
| 9-6 Solving Right Triangles | A) Use Trigonometry to Determine Missing Side Lengths and Angle Measures in Right Triangles | G.8.c |
| | B) Angles of Elevation and Depression | |
| | C) Using Angles of Elevation and Depression to Determine Missing Lengths | |
| 9-7 Area of Triangles and Law of Sines | A) Area of Triangles using Sine | |
| | B) Law of Sines to Determine Measures of Missing Lengths in Triangles | |
| | C) Law of Sines to Determine Measures of Interior Angles in Obtuse Triangles | |
| 9-8 Law of Cosines | A) Law of Cosines to Determine Measures of Missing Lengths in Triangles | |
| | B) Law of Cosines to Determine Measures of Interior Angles in Triangles | |

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Chapter 10 Circles

| Lesson | Topic | VA MSL |
|--|---|----------------|
| 10-1 Introduction to Circles | A) Segments in Circles | G.11.a |
| | B) Major and Minor Arcs | |
| | C) Central Angles | |
| 10-2 Tangents | A) Tangent Lines and Circles | G.11.a, G.11.b |
| | B) Tangent Lines and Radii | |
| | C) Lengths of Tangent Segments Intersecting in the Exterior of a Circle | |
| 10-3 Inscribed Angles | A) Inscribed Angles and Their Intercepted Arcs | G.11.a |
| | B) Inscribed Angles That Intersect the Same Arc | |
| | C) Right Triangles and Quadrilaterals Inscribed in Circles | |
| 10-4 Special Segment and Angle Relationships | A) Measures of Angles formed by Segments Intersecting in the Interior or Exterior of a Circle | G.11.a, G.11.b |
| | B) Lengths of Segments Intersecting in the Interior or Exterior of a Circle | |
| 10-5 Chord Theorems | A) Congruent Chords and Their Intercepted Arcs | G.11.a, G.11.b |
| | B) Perpendicular Diameters and Chords | |
| | C) Chords That are Equidistant from the Center | |
| 10-6 Equations of Circles | A) Write an Equation of a Circle | G.1.c, G.12 |
| | B) Determine the Center and the Radius from an Equation of a Circle | |
| | C) Similar Circles | |

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Chapter 11 Perimeter, Area, and Circumference

| Lesson | Topic | VA MSL |
|--|--|----------------|
| 11-1 Areas of Quadrilaterals | A) Area of Parallelograms, Kites, Rhombuses, and Trapezoids | |
| 11-2 Areas of Triangles | A) Area of Triangles Given Base and Height | |
| | B) Area of Equilateral Triangles Given Side Length | |
| 11-3 Perimeter and Area of Regular Polygons | A) Perimeter of Regular Polygons | |
| | B) Area of Regular Polygons Given Apothem or Perimeter | |
| 11-4 Area of Regular Polygons with Right Triangles | A) Area of Regular Polygons Using Special Right Triangles | G.8.c |
| | B) Area of Regular Polygons Using Trigonometry | |
| 11-5 Arc Length and Sectors | A) Use Arc Length to Determine Measures of Segments and Angles in a Circle | G.11.c, G.11.d |
| | B) Use Sectors to Determine Measures of Segments and Angles in a Circle | |

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Chapter 12 Solids

| Lesson | Topic | VA MSL |
|---|--|---|
| 12-1 Introduction to Solids | A) Faces, Vertices, Edges | |
| | B) Naming Solids | |
| | C) Rotations of Two-Dimensional Figures | |
| 12-2 Surface Area of Prisms and Cylinders | A) Surface Area Given Nets | G.13 |
| | B) Lateral Area of Right Prisms and Cylinders | |
| | C) Surface Area of Right Prisms and Cylinders | |
| 12-3 Surface Area of Pyramids and Cones | A) Surface Area Given Nets | G.13 |
| | B) Lateral Area of Right Pyramids and Cones | |
| | C) Surface Area of Right Pyramids and Cones | |
| 12-4 Volume of Prisms and Cylinders | A) Volume of Right Prisms and Cylinders | G.13 |
| | B) Volume of Oblique Prisms and Cylinders | |
| 12-5 Volume of Pyramids and Cones | A) Volume of Right Pyramids and Cones | G.13 |
| | B) Volume of Oblique Pyramids and Cones | |
| 12-6 Surface Area and Volume of Spheres | A) Segments in Spheres | G.13 |
| | B) Surface Area of Spheres | |
| | C) Volume of Spheres | |
| 12-7 Ratios of Lengths, Areas, and Volumes of Similar Figures | A) Ratios of Length, Area, and Volume in Similar Solids | G.1.c, G.13, G.14.a, G.14.b, G.14.c, G.14.d |
| | B) Using Ratios of Similar Figures to Find Lengths, Areas, and Volumes | |