

Mathematics

Course: Geometry

9th Grade

MATH 300 Geometry

1 credit
5 days per week; 1 year
Taught in English

This is a required class for all 9th grade students in the Mexican and/or U.S. diploma program. Course content includes the study of: points, lines and planes, parallel lines and planes, congruent triangles, similar polygons, right triangles, circles, and coordinate geometry. Proofs will be introduced but not emphasized. An introduction to algebra that involves properties of real numbers, algebraic expressions, solving equations, solving inequalities, absolute value and probability.

Textbook: Bass, Laurie E., et. al. Geometry. Prentice/Hall. Upper Saddle River, NJ (2004 Edition)
Bellman, Allan E., Algebra 2. Prentice/Hall: Upper Saddle River, NJ (2004) Edition
Prerequisite: MATH 200

Benchmark Code-Subject: Geometry = GEO; Algebra = A

- Strand 1: Geometric Representations
- Strand 2: Angles
- Strand 3: Polygons
- Strand 4: Triangles
- Strand 5: Right Angle Trigonometry
- Strand 6: Quadrilaterals
- Strand 7: Three-Dimensional Geometry
- Strand 8: Introduction to Analytic Geometry

Code: Subject.Grade.Strand#.Benchmark#

Example: GEO.9.1.4.3 – Geometry, Grade 9th, Strand 1, Standard 4, Benchmark 3

Strand 1: Geometric Representations

Standard 1: The student identifies, describes, and compare points, lines, and planes to be used to define other geometric terms such as angles and segments.

Benchmark Code	Benchmark
GEO.9.1.1.1	The student will identify collinear points, coplanar point, and intersecting lines and planes.
GEO.9.1.1.2	The student will justify and use the Pythagorean Theorem.
GEO.9.1.1.3	The student will use the distance formula to calculate the distance between two points on a number line and between two points in a coordinate plane.

Strand 2: Angles

Standard 1: The student understands angles as measurement of rotation and its relationship to the circle using different units.

Benchmark Code	Benchmark
GEO.9.2.1.1	The student will draw angles in standard form on the coordinate plane.

GEO.9.2.1.2	The student will classify angle according to their measures and the sums of their measures., including complementary and supplementary angles.
GEO.9.2.1.3	The student will find reference angles and coterminal angles from a graph and algebraically.
GEO.9.2.1.4	The student will express non-whole number measures of angles in the sexagesimal system.
GEO.9.2.1.5	The student will recognize and use relationships among arcs, chords, and diameters.
GEO.9.2.1.6	The student will write angle measures in degrees or radians.
GEO.9.2.1.7	The student will identify and use congruent angles and the bisector of an angle.
GEO.9.2.1.8	The student will determine all the measures of the angles formed by two parallel lines and a transversal if the measure of one of those angles is known.
GEO.9.2.1.9	The student will convert units from degrees to radians and from radians to degrees.
Strand 3: Polygons	
Standard 1: The student identifies and names polygons and finds interior and exterior angle measures of convex and regular polygons; and determines the area and perimeter of regular polygons.	
Benchmark Code	Benchmark
GEO.9.3.1.1	The student will classify polygons according to their construction. (number of sides)
GEO.9.3.1.2	The student will name any polygon of n number of sides by using Greek prefixes.
GEO.9.3.1.3	The student will identify the parts of a polygon.
GEO.9.3.1.4	The student will use the polygon angle-sum theorem to find internal and external angles of a polygon.
GEO.9.3.1.5	The student will find and calculate perimeter and area of polygons.
GEO.9.3.1.6	The student will identify similar figures and use them to solve problems.
GEO.9.3.1.7	The student will identify congruent figures.
Strand 4: Triangles	
Standard 1: The student knows the relationship and properties triangles and uses them to find missing sides.	
Benchmark Code	Benchmark
GEO.9.4.1.1	The student will identify the medians, altitudes, centroids, and orthocenters of a triangle.
GEO.9.4.1.2	The student will determine the coordinates of the centroid of the triangle both graphically and analytically.
GEO.9.4.1.3	The student will recognize and use ratios and proportions and apply their properties.
GEO.9.4.1.5	The student will use the properties of similarity in right triangles to find missing sides or angles.

GEO.9.4.1.6	The student will use proportional parts of triangles to solve problems and divide a segment into congruent parts.
GEO.9.4.1.7	The student will recognize and use the proportional relationships of corresponding perimeters, altitudes, angle bisectors, and medians of similar triangles.
GEO.9.4.1.8	The student will prove two triangles are congruent by Side, Side, Side, Side-Angle-Side, Angle-Side-Angle, and Angle-Angle-Side and HL theorems.
GEO.9.4.1.9	The student will find the missing measures of sides and angles for two congruent triangles by applying CPCTC (corresponding parts of congruent triangles are congruent).
GEO.9.4.1.10	The student will identify and use the properties of medians, altitudes, angle bisectors, and perpendicular bisectors in a triangle to solve problems.

Strand 5: Right Angle Trigonometry

Standard 1: The student determines the basic trigonometric functions for the two acute angles of a right triangle and solves problems using them.

Benchmark Code	Benchmark
GEO.9.5.1.1	The student will find all six trigonometric functions (SOH CAH TOA)
GEO.9.5.1.2	The student will use tangent, sine, and cosine ratios to find missing sides of right triangles.
GEO.9.5.1.3	The student will use inverse tangent, inverse sine, and inverse cosine to find missing angles.
GEO.9.5.1.4	The student will apply the Pythagorean theorem and its converse to find area.
GEO.9.5.1.5	The student will apply the properties of special right triangles to find area and missing sides. (60° , 30° , 90°) and (45° , 45° , 90°)
GEO.9.5.1.6	The student will use trigonometric functions to calculate area in figures.
GEO.9.5.1.7	The student will graph dilations on a coordinate plane and find the scale factor of a dilation.
GEO.9.5.1.8	The student will verify experimentally the properties of a dilation given a center and scale factor.

Strand 6: Quadrilaterals

Standard 1: The student classifies quadrilaterals according to their characteristics and properties and solves problems using them.

Benchmark Code	Benchmark
GEO.9.6.1.1	The student will classify quadrilaterals.
GEO.9.6.1.2	The student will identify properties of parallelograms.
GEO.9.6.1.3	The student will prove that a quadrilateral is a parallelogram by analyzing their unique properties.
GEO.9.6.1.4	The student will recognize and apply the properties of rectangles and squares.
GEO.9.6.1.5	The student will recognize and apply the properties of rhombi and trapezoids.

Strand 7: Three-Dimensional Geometry	
Standard 1: The student classifies polyhedrons and determines their volume and surface area and solves problems related to space.	
Benchmark Code	Benchmark
GEO.9.7.1.1	The student will identify and classify polyhedrons.
GEO.9.7.1.2	The student will identify the elements of a polyhedron.
GEO.9.7.1.3	The student will create cross sections and other slices of solids.
GEO.9.7.1.4	The student will construct polyhedrons.
GEO.9.7.1.5	The student will identify congruent or similar solids and state the properties of congruent solids.
GEO.9.7.1.6	The student will recognize and define basic properties of spheres.
GEO.9.7.1.7	The student will recognize right circular cones and cylinders.
GEO.9.7.1.8	The student will identify the elements of right circular cones and cylinders..
Standard 2: The student understands the following concepts about area as applied to finding the surface area of 3-dimensional figures.	
Benchmark Code	Benchmark
GEO.9.7.2.1	The student will find the surface area of three dimensional solids.
GEO.9.7.2.2	The student will find the lateral area and surface area of a right prism and a right cylinder.
GEO.9.7.2.3	The student will find the lateral area and surface area of a regular pyramid and a right circular cone.
GEO.9.7.2.4	The student will find areas of circles and sectors.
GEO.9.7.2.5	The student will find the surface area of a sphere.
Standard 3: The student understands the following concepts about area as applied to finding the volume of 3-dimensional figures	
Benchmark Code	Benchmark
GEO.9.7.3.1	The student will find the volume of a right prism and a right cylinder.
GEO.9.7.3.2	The student will find the volume of prisms, pyramid, cylinder, circular cone and sphere.
Strand 8: Introduction of Analytic Geometry	
Standard 1: The student finds equations by analysing the geometric properties of conic sections.	
Benchmark Code	Benchmark
GEO.9.8.1.1	The student will analyze and graph vertical and horizontal parabolas.
GEO.9.8.1.2	The student will write equations of parabola. ($\square^2 = 4\square\square$ and standard form)
GEO.9.8.1.3	The student will graph shifted parabolas.
GEO.9.8.1.4	The student will analyze and graph ellipses.
GEO.9.8.1.5	The student will write equations of ellipses.
GEO.9.8.1.6	The student will find the eccentricity of an ellipse.

GEO.9.8.1.7	The student will graph shifted ellipses.
GEO.9.8.1.8	The student will analyze and graph hyperbolas.
GEO.9.8.1.9	The student will write equations of hyperbolas.
GEO.9.8.1.10	The student will graph shifted hyperbolas
GEO.9.8.1.11	The student will analyze and graph polar equations of conics.