NC 224A: GEOMETRY A

Citrus College Course Outline of Record

Heading	Value
Effective Term:	Fall 2022
Credits:	0
Total Contact Hours:	60
Lecture Hours :	60
Lab Hours:	0
Hours Arranged:	0
Outside of Class Hours:	120
Prerequisite:	Placement by a high school counselor.
Transferable to CSU:	No
Transferable to UC:	No
Grading Method:	Non-Credit Course

Catalog Course Description

This integrated mathematics college preparatory course builds on the Algebra I course. Topics taught include sampling and reasoning, linear systems, matrices, geometry (coordinate geometry, triangles, circles, and spheres), probability, and binomials. The course format will involve application of mathematics to real world problems, hands-on classroom activities to investigate concepts and applications compliant with the recently adopted California State Mathematics Standards to meet the minimum course requirements for high school graduation. 60 lecture hours.

Course Objectives

- Identify and give examples of undefined terms, axioms, theorems, and inductive and deductive reasoning.
- Write geometric proofs.
- Construct and judge the validity of a logical argument and give counterexamples to disprove a statement.
- Prove basic theorems involving congruence and similarity.
- Prove that triangles are congruent or similar and use the concept of corresponding parts of congruent triangles.
- Understand and use the triangle inequality theorem.
- Prove and use theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles.
- Understand, derive, and solve problems involving the perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures.
- Compute the volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres. Memorize the formulas for prisms, pyramids, and cylinders.
- Compute areas of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids.
- Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.
- Find and use measures of sides, interior and exterior angles of triangles and polygons to classify figures and solve problems.
- Prove relationships between angles in polygons by using properties of complementary, supplementary, vertical, and exterior angles.
- Prove the Pythagorean theorem.
- Use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.
- Perform basic constructions with a straightedge and compass.
- Prove theorems by using coordinate geometry.
- Understand the definitions of the basic trigonometric functions defined by the angles of a right triangle. Understand and use elementary relationships between them.
- Use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.
- Understand and use angle and side relationships in problems with special right triangles.
- Prove and solve problems regarding relationships among chords, secants, tangents, inscribed angles, and inscribed and circumscribed polygons of circles.
- Understand the effect of rigid motions on figures in the coordinate plane and space.

Major Course Content

1. Axioms, theorems, inductive and deductive reasoning
2. Geometric proofs, including proofs by contradiction
3. Validity of a logical argument and counterexamples
4. Basic theorems involving congruence and similarity
5. Prove that triangles are congruent or similar and use the concept of corresponding parts of congruent triangles.
6. Triangle inequality theorem
7. Theorems involving the properties of parallel lines cut by a transversal, the properties of quadrilaterals, and the properties of circles
8. Problems about perimeter, circumference, area, volume, lateral area, and surface area of common geometric figures
9. Volumes and surface areas of prisms, pyramids, cylinders, cones, and spheres
10. Area of polygons, including rectangles, scalene triangles, equilateral triangles, rhombi, parallelograms, and trapezoids
11. Determine how changes in dimensions affect the perimeter, area, and volume of common geometric figures and solids.
12. Find and use measures of sides, interior/exterior angles of triangles and polygons.
13. Relationships between angles in polygons. Properties of complementary, supplementary, vertical, and exterior angles
14. Pythagorean theorem
15. Use the Pythagorean theorem to determine distance and find missing lengths of sides of right triangles.
16. Basic constructions with straightedge and compass, such as angle bisectors, perpendicular bisectors, and the line parallel to a given line through a point off the line
17. Prove theorems by using coordinate geometry, including the midpoint of a line segment, the distance formula, and various forms of equations of lines and circles.
18. Definitions of the basic trigonometric functions defined by the angles of a right triangle. Elementary relationships between them. For example, $\tan(x) = \sin(x)/\cos(x)$, $(\sin(x))^2 + (\cos(x))^2 = 1$.
19. Use trigonometric functions to solve for an unknown length of a side of a right triangle, given an angle and a length of a side.

20. Angle and side relationships in problems with special right triangles, such as 30°, 60°, and 90° triangles and 45°, 45°, and 90° triangles
21. Problems about relationships among chords, secants, tangents, inscribed angles, and inscribed/circumscribed polygons of circles
22. Effect of rigid motions on figures in the coordinate plane and space, including rotations, translations, and reflections

Instruction Type(s)

Lecture, Online Education Lecture