BAKER COLLEGE
STUDENT LEARNING OUTCOMES

MTH3610 College Geometry
3 Semester Hours

Student Learning Outcomes & Enabling Objectives

1. Identify applications of geometric relationships in areas such as art, science, and architecture.
2. Construct inductive and deductive arguments involving geometric concepts such as parallel, perpendicular, congruence, similarity, sequencing, and the Pythagorean relationship.
    a. Communicate geometric concepts using correct mathematical language and notation.
    b. Formulate a conjecture based on observations.
    c. Construct a mathematical proof or counterexample based on geometric definitions, axioms, theorems, and corollaries.
3. Analyze planar figures based on their defining characteristics.
    a. Explain foundational Euclidean geometric concepts such as line, point, plane, angle, parallel, and perpendicular.
    b. Identify symmetry in two-dimensional figures.
    c. Categorize two-dimensional figures based on their geometric properties.
    d. Calculate unknown measures for sides and angles of polygons from given information including the geometric characteristics of the polygon and the Pythagorean Theorem.
    e. Calculate unknown measures for circles including the circumference, length of radii, length of diameter, arc length, chord length, central angles, inscribed angles, and angles formed by lines intersecting a circle.
    f. Calculate the area of a polygon or circle.
4. Analyze solids based on their defining characteristics.
    a. Extend the characteristics of two-dimensional geometric figures to their three-dimensional counterparts.
    b. Categorize three-dimensional figures based on their geometric properties.
    c. Identify symmetry in three-dimensional figures.
    d. Calculate the volume of a solid, including cylinders and spheres.
5. Apply congruence and similarity to evaluate geometric figures.
    a. Define congruence and similarity in relation to geometric figures.

    b. Calculate unknown values from given information when geometric figures are congruent or similar.
    c. Describe the relationship between geometric transformations such as translations, reflections, rotations, and dilations, and congruence and similarity.
6. Complete geometric constructions using a compass and straightedge or interactive software.
    a. Identify the key relationships maintained in a given geometric construction.
    b. Identify the locus, when it exists, with respect to a specified geometric characteristic.
7. Apply geometric properties to analyze figures in the coordinate plane.
    a. Graph points, lines, segments, and geometric shapes in the Cartesian coordinate system.
    b. Calculate the slope of a line, distance between two points, and the midpoint of a line segment.
    c. Determine whether lines in a plane are parallel or perpendicular using coordinates of points on each of the lines.
    d. Apply geometric properties to calculate unknown measures area for figures in the coordinate plane.
8. Explore Non-Euclidean geometry.
    a. Describe the role of the parallel postulate in Euclidean geometry.
    b. Describe the parallel postulate as applied to non-Euclidean spherical geometry.

Big Ideas and Essential Questions

Big Ideas

- Geometry
- Mathematical Proof

Essential Questions

1. How does geometry help me study the world around me?
2. How does a mathematical proof support our understanding of geometry?

These SLOs are not approved for experiential credit.

Effective: Fall 2017