

TxCETP Course Component

Geometric Constructions

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I. Introduction

Objectives: The teacher understands:

- Measurement as a process.
- Geometries, in particular Euclidean geometry, as axiomatic systems.
- The results, uses, and applications of Euclidean geometry.

Prerequisites: Algebra I, Geometry, Algebra II, Pre-Calculus

Materials: Compass
Straight edge
Geometer Sketchpad

Game Plan: This is intended primarily for use in capstone courses for pre-service mathematics teachers.

Resources:

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II. Activities

1. Use a compass and straightedge to construct a segment congruent to a given segment. Explain your method and why it works.
2. Use a compass and straightedge to construct an angle congruent to a given angle. Explain your method and why it works.
3. Use a compass and straightedge to bisect a given angle. Explain your method and why it works.
4. Use a compass and straightedge to construct a line perpendicular to a given line at a point on the line. Explain your method and why it works.
5. Use a compass and straightedge to construct a line perpendicular to a given line from a given point not on the line. Explain your method and why it works.
6. Use a compass and straightedge to construct a perpendicular bisector of a line segment. Explain your method and why it works.
7. Use a compass and straightedge to construct a line parallel to a given line. Explain your method and why it works.
8. Use a compass and straightedge to construct a line perpendicular to a given line at a point on the line. Explain your method and why it works.
9. Use a compass and a straightedge to locate the center of a given circle. Explain your method and why it works.
10. Use your compass and straightedge to inscribe a circle in a triangle. Explain your method and why it works.
11. Now use Geometer Sketchpad to perform at least two of the above constructions.
12. Use Geometer Sketchpad to investigate the properties of parallelograms, trapezoids, rectangles, squares, and rhombuses. Make a chart to compare and contrast the properties of each of these figures. Be sure to include properties about the sides, angles, and diagonals of each quadrilateral.
13. Use Geometer Sketchpad to **construct** a parallelogram. Explain how you accomplished this construction.
14. A park is in the shape of an acute triangle. You want to place a water fountain at a point in the park that is equidistant from the sides of the park. How would you locate the point at which you will place the water fountain?