

A Final Challenge

Unit 4: Flip, Slide and Turn

Grade Level

Grade 7-accelerated

Overview

In this task, students use construction techniques to create a regular octagon.

Key Standards

M7G1. Students will construct plane figures that meet given conditions.

- a. Perform basic constructions using both compass and straight edge, and appropriate technology. Constructions should include copying a segment; copying an angle; bisecting a segment; bisecting an angle; constructing perpendicular lines, including the perpendicular bisector of a line segment; and constructing a line parallel to a given line through a point not on the line.
- b. Recognize that many constructions are based on the creation of congruent triangles.

Possible Materials

- compass
- straightedge
- plain copy paper

Task

A Final Challenge: Constructing a Regular Octagon

You've already completed many challenging constructions, so you are ready for a final challenge: The Construction of a Regular Octagon. How would you construct a regular octagon? Discuss this with a partner and come up with a strategy. Think about what constructions might be needed and how they might be completed. Be prepared to share your ideas with the class.

Experiment to see if your strategy works and justify why your strategy works.

Sample Questions

1. How does the construction of a square relate to the construction of an octagon?
2. How would inscribing your construction within a circle be helpful?
3. Why is it not appropriate to use the ruler as a measuring device?

4. What must be true of a regular polygon?
5. How can you insure that you've constructed a regular octagon, rather than simply an 8-sided polygon?

Sample Question Solutions

1. Opposite vertices of a regular octagon, when connected, create a square.
2. All vertices would be equidistant from the center.
3. Using a ruler to measure is an estimation strategy. Compasses are used to determine if two line segments have equal length.
4. All angles must be congruent, all sides must be congruent.
5. Use your compass to "measure" the lengths of the sides.

Assessment Ideas

Students can be assessed on their understanding of constructions and problem solving abilities throughout this task.