

What's My Four-tune? (Table 3)

Problem Statement:

Find a relationship between the areas of squares 1, 2, and 3. Also find a relationship for their perimeters. Predict the area and perimeter of square 10. Predict the area and perimeter of square n ?

Purpose: The purpose of this lesson is for students to discover the scale factor relationships of perimeter or side-length of two different squares, and the scale factors squared relationship of area of two different squares.

$$m \overline{AB} = 6.00 \text{ cm}$$

$$m \overline{BC} = 6.00 \text{ cm}$$

$$m \overline{CD} = 6.00 \text{ cm}$$

$$m \overline{DA} = 6.00 \text{ cm}$$

Move Point

Move Point

Move Point

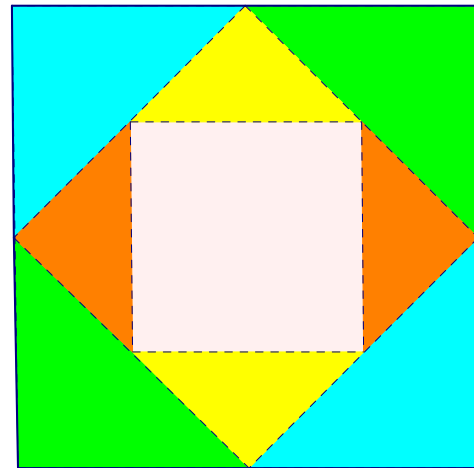
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Rationale: This problem uses an engaging model (fortune teller) with which students are familiar to discover the relationships of between area and perimeter of squares. Also, this model allows students to see the relationship between squares with half the area of each other, which counter student expectations of half area corresponding to half side length.

Is the problem appropriate?

- Similar figures, scale factor, area, perimeter, diagonals, square roots, measurement (perimeter)
- There are a variety of entry points (counting squares, using ruler)
- Generating formulas, series (limit of adding areas)

Anticipated Student Responses

Area

- Measure sides of a largest square (square 1) (in inches or cm or generic units) and find area by squaring
- "Grid"ing off the origami paper and counting squares to find area
- Manipulative tiles covering
- cm cubes covering
- Comparing area by folding to cover

- Comparing area by cutting and comparing to initial square (maybe finding that square 2 is a little more than half square 1 because of the error in cutting and tiling)

- comparing the corner triangles (cut off from around square 2) to square 1

Perimeter

- Measure one side (using any unit as above) and multiply by 4

- Use string and measure

- measure each side separately and add

- compare measurements to find ratio (of Perimeter square 1: Perimeter square 2: Perimeter square 3)

- compare sides to find ratio

Patterns

- Generate a table

- Use physical objects to estimate

- Graph them (Triangle N v Perimeter N or Area N)

- series of coordinate pairs