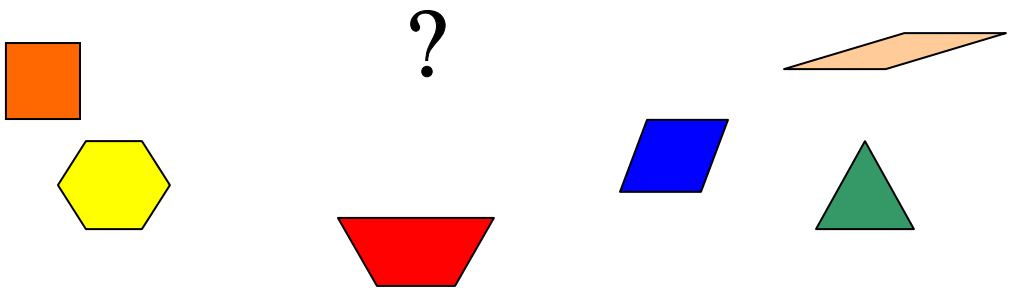
Puzzling Polygons



Polly and Pat have a quiz on properties, perimeter, and area of polygons. Their teacher has decided to make puzzle cards as a fun way to encourage students to study for the quiz. Students were instructed to work in pairs using pattern blocks to represent the shapes of some common polygons. A set of six cards were distributed to each pair of students and instructions were given. Polly and Pat worked together on the "puzzling polygons" and completed each one successfully.

Work with a partner using pattern blocks or pattern block shapes to arrange a set of blocks in an appropriate order from left to right satisfying the conditions stated on each card of "Puzzling Polygons". Record and discuss your work with another group to verify results. How "puzzling" were these polygons for you and your partner group?

1. How do the lengths of the sides of the pattern block polygons compare?

2. How do the measures of the angles of the pattern block polygons compare?

3. Which pattern block polygons are parallelograms? Justify your reasoning.

4. Which polygons are equilateral? Equiangular? Both? Explain.

5. Which pattern block polygons have the same perimeter? How do you know?

6. How do the areas compare? Which pattern block polygons have an area that is a multiple of the area of other polygon(s)? Justify your answers.

7. Which pattern block polygons have one or more angles congruent to the angles of the equilateral triangle? Explain.

Puzzling Polygons

Cut out the polygon puzzle cards and use definitions and properties of polygons to arrange pattern block shapes in a row satisfying the conditions given on each card. Record each arrangement for comparison with another group's work.

Four in a Row

1. The polygon on the left has an area ½ the area of the polygon next to it. The third polygon has a perimeter that is 2/3 the perimeter of the second. The last polygon has an area 1/3 the area of the first.

Four in a Row

2. The first two polygons have acute and obtuse angles and the same perimeter. The third polygon is isosceles and has acute angles. The fourth polygon has adjacent sides that are perpendicular.

Four in a Row

3. The ratio of the perimeters of the first three polygons is 3: 4: 5. The ratio of the areas of the last three polygons is 1: 1.5 : 3.

Five in a Row

4. The two polygons on the left are equiangular. Their angle measures have a ratio of 2:3. The third polygon is also equiangular with a sum of its interior angles equal to 720°. The fourth polygon has at least 2 parallel sides and 2 obtuse angles. The last polygon has diagonals that are perpendicular and bisect each other.

Five in a Row

5. The first and third polygons are congruent. A diagonal of these polygons divides each into 2 right isosceles triangles. The second polygon has an interior angle twice an interior angle of the last. The fourth polygon has acute angles congruent to the last and obtuse angles congruent to the second.

Five in a Row

6. A diagonal divides each polygon into two congruent polygons except for the second and third. The sum of the perimeters of the five polygons is 22 units. All polygons have at least 2 sides parallel except for the third. The last two polygons are parallelograms. The fourth polygon has congruent diagonals.