

## 9.3 Area of Similar Polygons

- Understand the relationship between the scale factor of similar polygons and their areas.
- Apply scale factors to solve problems about areas of similar polygons.

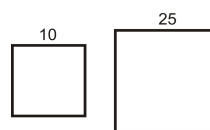
## Areas of Similar Polygons



In Unit 7 we learned that polygons are similar when the corresponding angles are equal and the corresponding sides are in the same proportion.

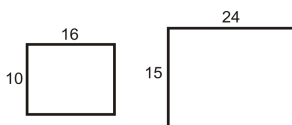
We also discussed the relationship of the perimeters of similar polygons. In other words, the scale factor for the sides of two similar polygons is the same as the ratio of the perimeters.

1. Are two squares similar?      Are two rectangles?



2. Find the scale factor of the sides of the similar shapes. Both figures are squares.
3. Find the area of each square.
4. Find the ratio of the smaller square's area to the larger square's area. Reduce it. How does it relate to the scale factor?

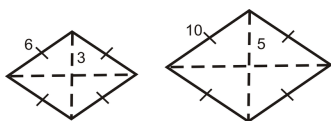
Example 1: The two rectangles below are similar. Find the scale factor and the ratio of the perimeters.



Example 2: Find the area of each rectangle from Example 1. Then, find the ratio of the areas.

**Area of Similar Polygons Theorem:** If the scale factor of the sides of two similar polygons is  $\frac{m}{n}$ , then the ratio of the areas would be  $\left(\frac{m}{n}\right)^2 = \frac{m^2}{n^2}$ .

Example 3: Find the ratio of the areas of the rhombi below. The rhombi are similar.



Example 4:

Two trapezoids are similar. If the scale factor is  $\frac{3}{4}$  and the area of the smaller trapezoid is  $81 \text{ cm}^2$ , what is the area of the larger trapezoid?

Example 5:

Two triangles are similar. The ratio of the areas is  $\frac{25}{64}$ . What is the scale factor?

Homework is a worksheet on line

Using the ratios from above, find the length of the base of the smaller triangle if the length of the base of the larger triangle is 24 units.