

- ① upper left corner 3×4
- ② overlapping rectangle 6×8

- (Verbal Directions)
- ③ overlapping 9×12
 - ④ overlapping 12×16

Continue to draw overlapping rectangles until you run out of paper

Rectangle #	Perimeter	Area
1	$3+4+3+4=14$	$3 \times 4 = 12$
2	$6+8+6+8=28$	$6 \times 8 = 48$
3	$9+12+9+12=42$	$9 \times 12 = 108$
4	$12+16+12+16=56$	$12 \times 16 = 192$

What do you notice about this data
perimeter is increasing by 14 each time

If they are similar • corresponding angles are \cong
• corresponding sides are proportional

$1+2$ $\frac{3}{6} = \frac{1}{2}$ and $\frac{4}{8} = \frac{1}{2}$ yes

$3+4$ $\frac{9}{12} = \frac{3}{4}$ and $\frac{12}{16} = \frac{3}{4}$ yes they are proportional

Find the area + perimeter of each rectangle

Complete the charts on the next page

Perimeters and Areas of Similar Figures

Step #1 On a sheet of coordinate grid paper do the following:

1. Draw a 3-unit by 4-unit rectangle in the upper left-hand corner. Label this rectangle 1.
2. Draw a 6-unit by 8-unit rectangle, overlapping rectangle 1. Label this rectangle 2.
3. Draw a 9-unit by 12-unit rectangle, overlapping rectangles 1 and 2. Label this rectangle 3.
4. Draw a 12-unit by 16-unit rectangle, overlapping rectangles 1, 2, and 3. Label this rectangle 4.

Step #2 Use your drawings to complete the following chart:

Rectangle	Perimeter	Area
1	$3 + 4 + 3 + 4 = 14$	$3 \times 4 = 12 \text{ m}^2$
2	$6 + 8 + 6 + 8 = 28$	$6 \times 8 = 48 \text{ m}^2$
3	$9 + 12 + 9 + 12 = 42$	$9 \times 12 = 108 \text{ m}^2$
4	$12 + 16 + 12 + 16 = 56$	$12 \times 16 = 192 \text{ m}^2$

Step #3 Use the information from the above chart to complete the following chart:

Rectangle	Similarity Ratios of Side Lengths	Ratio of Perimeters	Ratio of Areas
2 to 1	$\frac{6}{3}$ and $\frac{8}{4}$	$\frac{28}{14}$ or $2/1$	$\frac{48}{12}$ or $4:1$
3 to 1	$\frac{9}{3}$ and $\frac{12}{4}$	$\frac{42}{14}$ or $3/1$	$\frac{108}{12}$ or $9:1$
4 to 1	$\frac{12}{3}$ and $\frac{16}{4}$	$\frac{56}{14}$ or $4/1$	$\frac{192}{12}$ or $16:1$

5 to 1 $\frac{15}{3}$ and $\frac{20}{4}$ $\frac{70}{14}$ or $5/1$ $\frac{300}{12}$ or $25:1$
 can you fill in #5 without counting
Step #4 Answer the following questions:

- Square the perimeter to get the area*
1. How do the similarity ratios of side lengths compare to the ratio of perimeters for rectangles 2 to 1?
 2. How do the similarity ratios of side lengths compare to the ratio of perimeters for rectangles 3 to 1?
 3. How do the similarity ratios of side lengths compare to the ratio of perimeters for rectangles 4 to 1?
 4. How do the similarity ratios of side lengths compare to the ratio of areas for rectangles 2 to 1?
 5. How do the similarity ratios of side lengths compare to the ratio of areas for rectangles 3 to 1?
 6. How do the similarity ratios of side lengths compare to the ratio of areas for rectangles 4 to 1?

Name: _____ Date: _____ Period: _____

8-6 Perimeters and Areas of Similar Figures NOTES

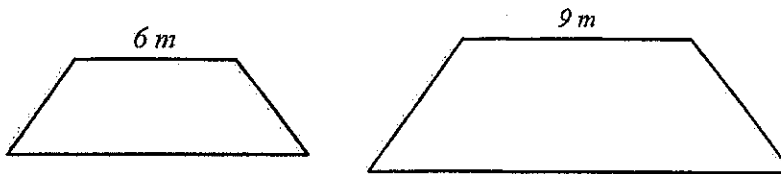
Essential Question: How do the perimeters and areas of similar figures compare?

- **PERIMETERS AND AREAS OF SIMILAR FIGURES:** If the similarity ratio of two similar figures is $\frac{a}{b}$, then:

1. The ratio of their perimeters is $\frac{a}{b}$.

2. The ratio of their areas is $\frac{a^2}{b^2}$.

Example #1: The trapezoids below are similar.



- A. What is the ratio of the side lengths of smaller trapezoid to the larger trapezoid? $\frac{2}{3}$
- B. What is the ratio of the perimeter of smaller trapezoid to the perimeter of larger trapezoid? $\frac{2}{3}$
- C. What is the ratio of the area of smaller trapezoid to the area of larger trapezoid? $\frac{2^2}{3^2} = \frac{4}{9}$
- } the same

Example #2: Two similar polygons have corresponding sides in the ratio 5 : 7.

- A. Find the ratio of their perimeters.

$$\frac{5}{7}$$



- B. Find the ratio of their areas.

$$\frac{5^2}{7^2} = \frac{25}{49}$$

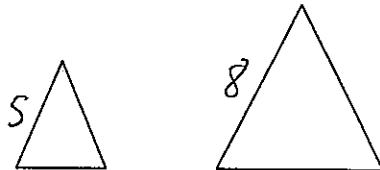
Example #3: Two triangles are similar. The area of the smaller triangle is about 25 cm^2 .

The area of the larger triangle is 64 cm^2 . Find the ratio of their side lengths.

Area ratio

$$\frac{25}{64}$$

perimeter ratio = $\frac{\sqrt{25}}{\sqrt{64}} = \frac{5}{8}$ sides 5:8



Find the ratio of their perimeter.

$$\frac{5}{8}$$

Find the ratio of their areas.

$$\frac{25}{64}$$