

<name>

Class: Honors Geometry

Date: <date>

Topic: Lesson 8-6 (Perimeter and Area of Similar Figures)

Theorem 8-6

Perimeters and areas of Similar Figures

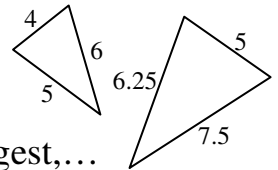
Given similarity ratio of $\frac{a}{b}$:

1. similarity ratio = ratio of the figures' perimeters ($\frac{a}{b} = \frac{P_1}{P_2}$)

2. (similarity ratio)² = ratio of the figures' areas ($\frac{a^2}{b^2} = \frac{A_1}{A_2}$)

Examples

1. These Δ are ~. Find ratio (larger to smaller) of their perims & areas.



Corr sides: shortest-shortest, longest-longest,...

$$\frac{5}{4} = \frac{7.5}{6} = \frac{6.25}{5} \dots \text{similarity ratio: } \frac{5}{4}$$

The ratio of the perimeters: $\frac{5}{4}$

$$\text{The ratio of the areas: } \frac{5^2}{4^2} = \frac{25}{16}$$

2. The ratio of lens of the corr. sides of 2 reg octagons is $\frac{8}{3}$. The area of larger octagon is 320 ft^2 . Find area of the smaller.

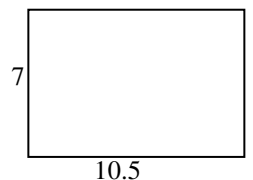
The similarity ratio is $\frac{8}{3}$. The ratio of the area is then $\frac{64}{9}$.

$$\frac{320}{A} = \frac{64}{9}; 64 \cdot A = 320 \cdot 9; A = \frac{2880}{64} = 45 \text{ ft}^2$$

3. Benita plants the same crop in 2 rect. fields, ea w/side lens in a ratio of 2 : 3. Ea dimension of the larger field is 3½ times the dimension of the smaller field. Seeding the smaller field costs \$8. What does it cost to seed the larger field?

Each field's sides has ratio 2 : 3. $2 \frac{\square}{3}$

The fields' similarity ratio is 3.5 : 1.



$$\frac{\text{cost large field}}{\text{cost small field}} = \frac{\text{area large field}}{\text{area small field}} = \frac{3.5^2}{1^2}$$

$$\frac{c}{8} = \frac{3.5^2}{1^2}; c = 8 \cdot 3.5^2 = 8 \cdot 3.5 \cdot 3.5 = \$98$$

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4. The areas of two similar pentagons are 32 in^2 and 72 in^2 . What is their similarity ratio? What is the ratio of their perimeters?

$$\text{The area ratio is } \frac{32}{72} = \frac{4}{9}.$$

$$\text{Similarity ratio: } \frac{4}{9} = \frac{a^2}{b^2}; \frac{a}{b} = \sqrt{\frac{4}{9}} = \frac{2}{3}$$

$$\text{Ratio of perimeters: } \frac{2}{3}$$

5. The similarity ratio of 2 similar Δ is 5 : 3. The perim of the smaller Δ is 36 cm , & its area is 18 cm^2 . Find the perim & area of the larger Δ .

Ratio of perimeters = similarity ratio:

$$\frac{P_{large}}{P_{small}} = \frac{5}{3}; \frac{P_{large}}{36} = \frac{5}{3}; P_{large} = \frac{36 \cdot 5}{3} = 60 \text{ cm}$$

Ratio of areas = (similarity ratio)²:

$$\frac{A_{large}}{A_{small}} = \frac{5^2}{3^2} = \frac{25}{9}; \frac{A_{large}}{18} = \frac{25}{9}; A_{large} = \frac{18 \cdot 25}{9} = 50 \text{ cm}^2$$