

# Lesson 2.6:

## Perimeters and Areas of Similar Figures

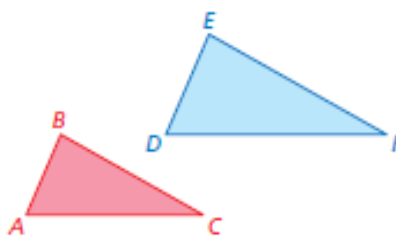
### Essential Question

How do changes in dimensions of similar geometric figures affect the perimeters and the areas of the figures?

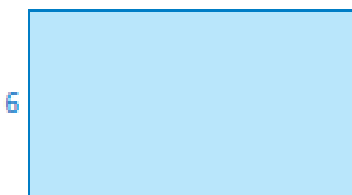
 **Key Idea****Perimeters of Similar Figures**

When two figures are similar, the ratio of their perimeters is equal to the ratio of their corresponding side lengths.

$$\frac{\text{Perimeter of } \triangle ABC}{\text{Perimeter of } \triangle DEF} = \frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$



Find the ratio (red to blue) of the perimeters of the similar rectangles.



$$\frac{4 \div 2}{6 \div 2} = \frac{2}{3} \text{ or } 2:3$$

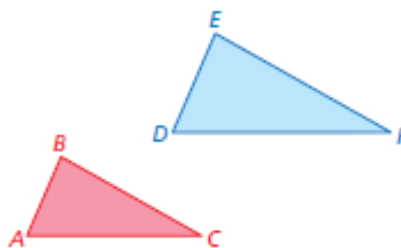
1. The height of Figure A is 9 feet. The height of a similar Figure B is 15 feet. What is the ratio of the perimeter of A to the perimeter of B?

$$\frac{9 \div 3}{15 \div 3} = \frac{3}{5} \text{ or } 3:5$$

### Key Idea

#### Areas of Similar Figures

When two figures are similar, the ratio of their areas is equal to the *square* of the ratio of their corresponding side lengths.

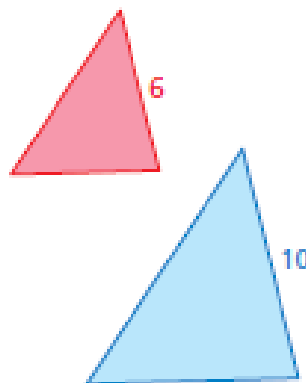


$$\frac{\text{Area of } \triangle ABC}{\text{Area of } \triangle DEF} = \left(\frac{AB}{DE}\right)^2 = \left(\frac{BC}{EF}\right)^2 = \left(\frac{AC}{DF}\right)^2$$

You can remember b/c area uses units squared!

Find the ratio (red to blue) of the areas of the similar triangles.

$$\left(\frac{6}{10}\right)^2 = \left(\frac{3}{5}\right)^2 = \boxed{\frac{9}{25}}$$



2. The base of Triangle P is 8 meters. The base of a similar Triangle Q is 7 meters. What is the ratio of the area of P to the area of Q?

$$\left(\frac{8}{7}\right)^2 = \frac{8^2}{7^2} = \boxed{\frac{64}{49}}$$

We are using ratios, so improper fractions are preferable to mixed numbers.

A swimming pool is similar in shape to a volleyball court.  
Find the perimeter  $P$  and the area  $A$  of the pool.



18 yd



10 yd

Area = 200 yd<sup>2</sup>

Perimeter = 60 yd

$$\frac{18}{10} = \frac{P}{60}$$

$$P = 108 \text{ yd}$$

$$\left(\frac{18}{10}\right)^2 = \frac{A}{200}$$

$$\frac{324}{100} = \frac{A}{200}$$

$$A = 648 \text{ yd}^2$$