Warm Up

1. Two polygons are similar and the ratio of corresponding sides is 3:4. What is the ratio of the perimeters?

   $3:4$

2. Solve: $\dfrac{12}{x} = \dfrac{18}{5}$

   $12 \cdot 5 = 18 \cdot x$

   $x = 3.3$

   $18\,ft$
   $x = 6\,ft$

3. A rectangle has area 108 square feet and the length is three times the width. What are the dimensions of the rectangle?

   $108\,ft^2$ x
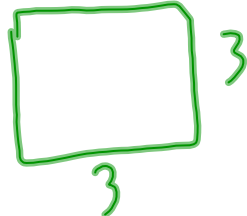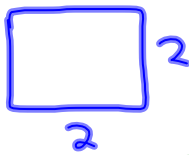 $3x$

   $3x \cdot x = 108$ $x^2 = 36$
   $3x^2 = 108$ $x = 6$

11-3   Perimeter and Area of Similar Figures

If two polygons are similar, then: $\dfrac{\text{side length of polygon 1}}{\text{side length of polygon 2}} = \dfrac{a}{b}$
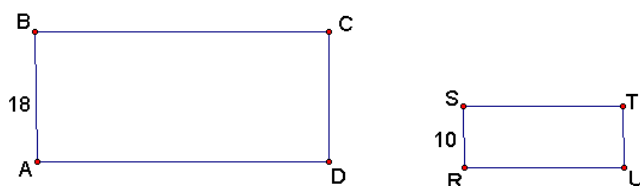
$\dfrac{\text{area of polygon 1}}{\text{area of polygon 2}} = \dfrac{a^2}{b^2}$

2

2

3

3

$\dfrac{2}{3} = \dfrac{8}{12} \neq \dfrac{4}{9}$

side   perim.   area
lengths

Ex 1   In the diagram, $ABCD \sim RSTU$

B   C
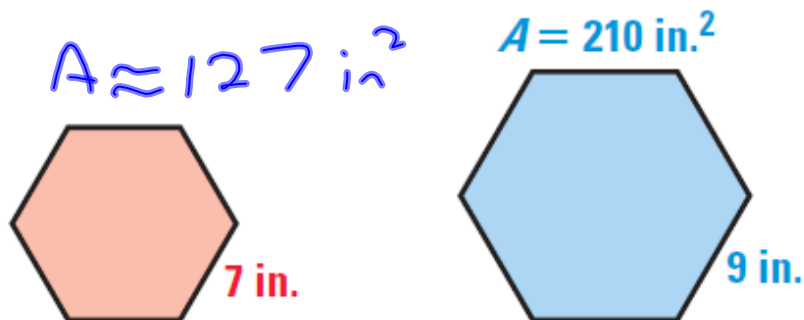
18

A   D

S   T

10

R   U

find the ratio of the perimeters

$$\frac{18}{10} \qquad \frac{9}{5}$$

find the ratio of the areas

$$\frac{18^2}{10^2} \qquad \frac{9^2}{5^2} = \boxed{\frac{81}{25}}$$

Ex. 2   Corresponding lengths in similar figures are given. Find the ratios (shaded to unshaded) of the perimeters and areas. Then find the unknown area.
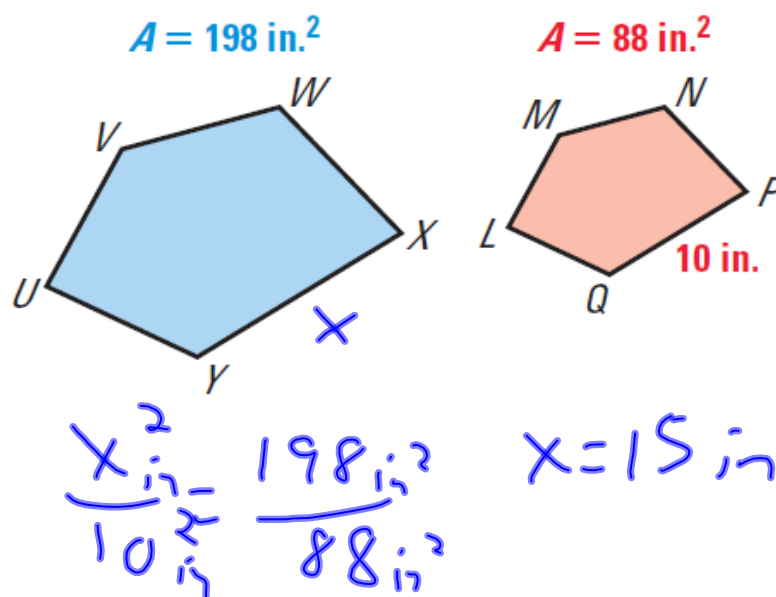
$$\frac{7}{9}$$

$$A \approx 127 \text{ in}^2 \qquad A = 210 \text{ in.}^2$$

7 in.   **9 in.**

$$\frac{7^2}{9^2} = \frac{A}{210}$$

Ex 3   A TV is 24 inches wide and 18 inches long.
A larger TV is similar to the smaller one.
The area of the larger screen is 657 square inches.
Find the width of the larger TV.

$432\,in^2$ $18in$ $657\,in^2$

$24in$

$$\frac{24^2}{w^2} = \frac{432}{657}$$

w

$w = 29.5\,in$
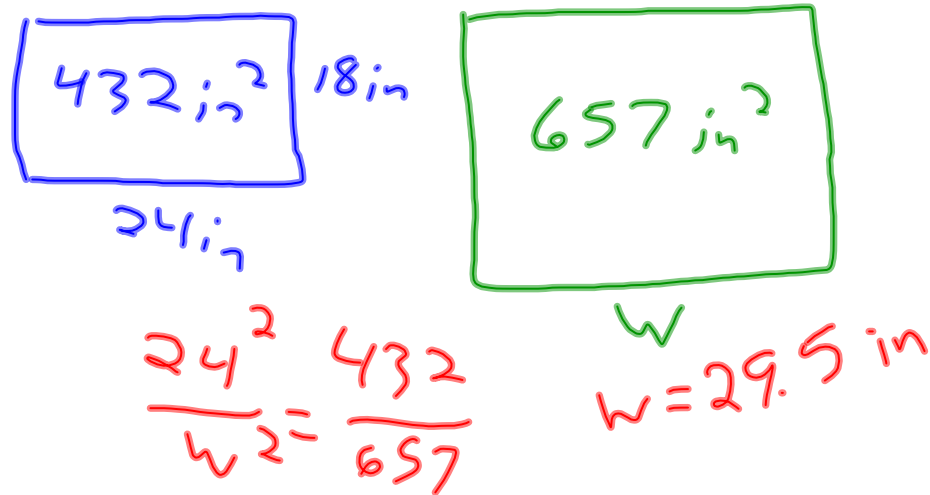
Ex. 4   The given figures are similar. Use the given area to find *XY*.

$A = 198\ in.^2$ $A = 88\ in.^2$

W   *N*

V   *M*

                                P

X   *L*

U   10 in.

        x   *Q*

Y

$$\frac{x^2_{in}}{10^2_{in}} = \frac{198\,in^2}{88\,in^2} \qquad x = 15\,in$$

Ex 5   The Pentagon in Washington DC has a base that is 900 ft
on each side and has an area of 1,400,000 ft². You are
making a model of the Pentagon for which the perimeter
of the base is 30 yd. Find the area of the base of the
model.

1,400,000
ft²

900 ft.

$$\frac{900 ft.^2}{6 yd^2} = \frac{1,400,600 ft^2}{A}$$

6 yd

$$62.2 yd^2$$