

**LESSON 11.3**

**Practice**

For use with pages 737-743

$a:b$

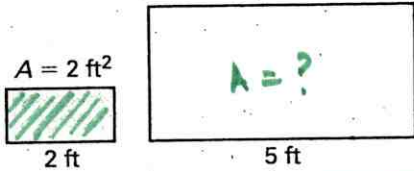
$a:b \xrightarrow{x^2} a^2:b^2$

Complete the table of ratios for similar polygons.

	Ratio of corresponding side lengths	Ratio of perimeters	Ratio of areas
1.	5:8	5:8	25:64
2.	4:7	4:7	16:49
3.	13:6	13:6	169:36
4.	66:18 = ? 11:3	11:3	121:9

Corresponding lengths in similar figures are given. Find the ratios (shaded to unshaded) of the perimeters and areas. Find the unknown area.

5.



Ratio Sides/Perim. Ratio Areas

$\frac{2}{5} \xrightarrow{x^2} \frac{4}{25}$

$\frac{a^2}{b^2} = \frac{A(\text{shaded})}{A(\text{unshaded})}$

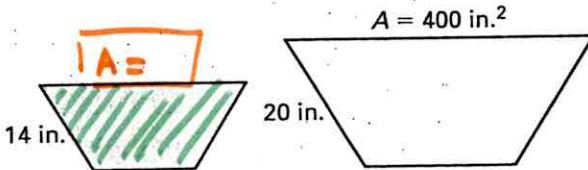
Ratio Areas = Areas

$\frac{4}{25} = \frac{2}{x}$

$4x = 50$   
 $x = 12.5$

$A = 12.5 \text{ ft}^2$

6.



Ratio sides Ratio Areas

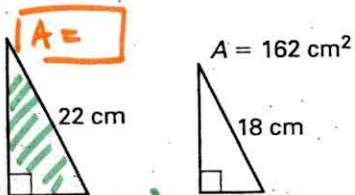
$\frac{14}{20} = \frac{7}{10} \xrightarrow{x^2} \frac{49}{100}$

Ratio Areas = Areas

$\frac{49}{100} = \frac{x}{400}$

$49x = 40000$   
 $A(\text{shaded}) = 196 \text{ in}^2$

7.



$\frac{22}{18} = \frac{11}{9} \xrightarrow{x^2}$

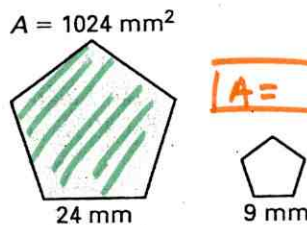
$\frac{a^2}{b^2} = \frac{121}{81}$

$\frac{a^2}{b^2} = \frac{A(\text{shaded})}{A(\text{unshaded})}$

$\frac{121}{81} = \frac{x}{162}$

$81x = 121(162)$   
 $A(\text{shaded}) = 242 \text{ cm}^2$

8.



$\frac{24}{9} = \frac{8}{3} \xrightarrow{x^2}$

$\frac{a^2}{b^2} = \frac{64}{9}$

$\frac{a^2}{b^2} = \frac{A(\text{shaded})}{A(\text{unshaded})}$

$\frac{64}{9} = \frac{1024}{x}$

$A(\text{unshaded}) = 144 \text{ mm}^2$

The ratio of the areas of two similar figures is given. Write the ratio of the lengths of corresponding sides.

9. Ratio of areas = 16:81

$\frac{a^2}{b^2} \xrightarrow{\sqrt{x}} \frac{a}{b}$   
 $\frac{16}{81} \rightarrow \frac{4}{9}$

10. Ratio of areas = 25:196

$\frac{a^2}{b^2} \xrightarrow{\sqrt{x}} \frac{a}{b}$   
 $\frac{25}{196} \xrightarrow{\sqrt{x}} \frac{5}{14}$

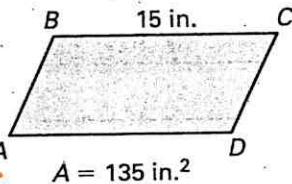
11. Ratio of areas = 144:49

$\frac{a^2}{b^2} \xrightarrow{\sqrt{x}} \frac{a}{b}$   
 $\frac{144}{49} \xrightarrow{\sqrt{x}} \frac{12}{7}$

**LESSON 11.3 Practice** *continued*  
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Use the given area to find **XY**.

12.  $ABCD \sim WXYZ$



Ratio Areas  $\frac{a^2}{b^2}$  Ratio Sides  $\frac{a}{b}$

$$\frac{135}{15} = \frac{9}{1} \rightarrow \sqrt{x} = \frac{3}{1}$$

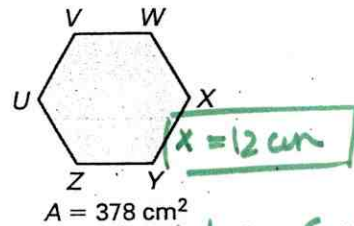
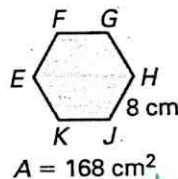
Ratio sides = sides

$$\frac{3}{1} = \frac{15}{x}$$

$$x = 5$$

Ratio Areas  $\frac{168}{378} = \frac{4}{9}$

13.  $EFGHJK \sim UVWXYZ$



Ratio Sides  $\frac{2}{3}$

Ratio Sides = Sides  $\frac{2}{3} = \frac{8}{x}$

$2x = 24$   
 $x = 12$

14. Regular octagon  $ABCDEFGH$  has a side length of 10 millimeters and an area of 160 square millimeters. Regular octagon  $JKLMNOPQ$  has a perimeter of 200 millimeters. Find its area.

Given info

Octagon A  
 $s = 10$  mm  
 $A = 160$  mm<sup>2</sup>

Octagon J  
 $P = 200 \rightarrow s = \frac{200}{8} = 25$  mm  
 $A = ?$

Ratio Sides  $\frac{10}{25} = \frac{2}{5}$  Ratio Areas  $\frac{4}{25}$

Ratio Areas = Areas  $\frac{4}{25} = \frac{160}{x}$

$4x = 4000$   
 $x = 1000$  mm<sup>2</sup>

15. Kites  $RSTU$  and  $VWXY$  are similar. The area of  $RSTU$  is 162 square feet. The diagonals of  $VWXY$  are 32 feet long and 18 feet long. Find the area of  $VWXY$ . Then use the ratio of the areas to find the lengths of the diagonals of  $RSTU$ .

Given info

Kite R  
 $A = 162$  ft<sup>2</sup>

Kite V  $\rightarrow A(\text{Kite V}) = \frac{d_1 \cdot d_2}{2}$   
 $d_1 = 32$  ft  
 $d_2 = 18$  ft  
 $A = \frac{32(18)}{2} = 288$  ft<sup>2</sup>

Ratio Areas  $\frac{162}{288} = \frac{9}{16}$  Ratio Sides  $\frac{3}{4}$

Ratio Sides = sides/diagonals  $\frac{3}{4} = \frac{d_1}{32}$   
 $\frac{3}{4} = \frac{d_2}{18}$   
 $d_1 = 24$  ft  
 $d_2 = 13.5$  ft

16.  $\triangle ABC$  and  $\triangle DEF$  are similar. The height of  $\triangle ABC$  is 42 inches. The base of  $\triangle DEF$  is 7 inches and the area is 42 square inches. Find the ratio of the area of  $\triangle ABC$  to the area of  $\triangle DEF$ .

Given info

$\triangle ABC$   
 $h = 42$  in  
 $b = 24.5$   
 $A = 514.5$  in<sup>2</sup>

$\triangle DEF$   
 $b = 7$  in  
 $A = 42$  in<sup>2</sup>  
 $h = 12$

Height  $\frac{12}{42} = \frac{7}{\text{base}(\triangle ABC)}$   
 $\frac{7h}{2} = 42 \rightarrow 7h = 84 \rightarrow h = 12$   
 $\text{base } \triangle ABC = 24.5$   
 $A(\triangle ABC) = \frac{24.5(42)}{2} = 514.5$

Ratio Areas  $\frac{\triangle ABC}{\triangle DEF} = \frac{514.5}{42} = \frac{49}{4}$

17. Rectangles  $ABCD$  and  $EFGH$  are similar. The width of  $ABCD$  is 18 centimeters and the perimeter is 120 centimeters. The length of  $EFGH$  is 91 centimeters. Find the ratio of the side lengths of  $ABCD$  to the side lengths of  $EFGH$ .

Given info

$ABCD$   
 $w = 18$  cm  
 $P = 120$  cm  
 $= 2l + 2(18)$   
 $l = 42$  cm

$EFGH$   
 $l = 91$  cm

Ratio of sides  $\frac{42}{91} = \frac{6}{13}$