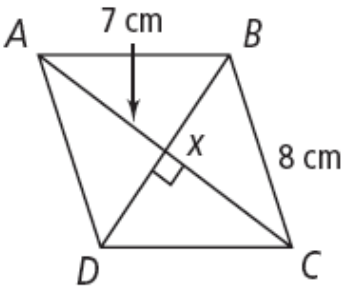
The area of a rhombus or a kite is $\frac{1}{2}d_1d_2$, where d_1 and d_2 are the lengths of the diagonals. The diagonals bisect each other and intersect at right angles.

Problem

What is the area of rhombus *ABCD*?



First find the length of each diagonal.

$d_1 = 7 + 7 = 14$ Diagonals of a rhombus bisect each other.

$8^2 = 7^2 + x^2$ Pythagorean Theorem

$64 = 49 + x^2$ Simplify.

$x = \sqrt{15}$

$d_2 = 2x = 2\sqrt{15}$

Use the formula for the area of a rhombus.

$A = \frac{1}{2}d_1d_2$ Substitute.

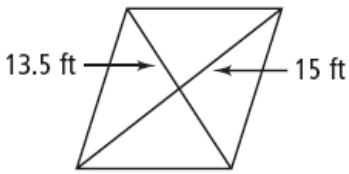
$= \frac{1}{2}(14)(2\sqrt{15})$ Simplify.

$= 14\sqrt{15}\ \text{cm}^2$

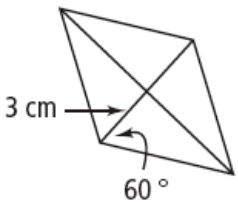
The area of rhombus *ABCD* is $14\sqrt{15}\ \text{cm}^2$.

Find the area of each rhombus. Leave your answer in simplest radical form.

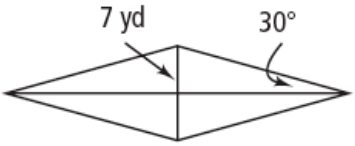
10.



11.

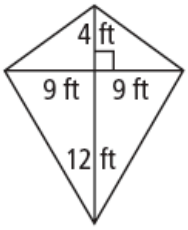


12.

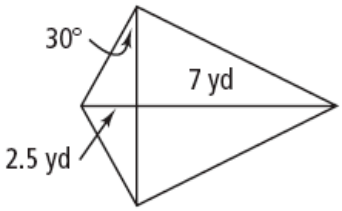


Find the area of each kite. Leave your answer in simplest radical form.

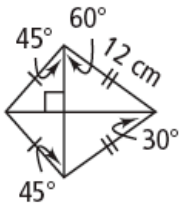
13.



14.

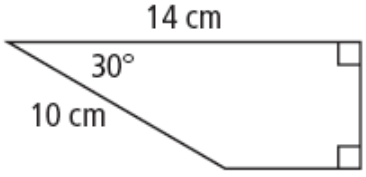


15.

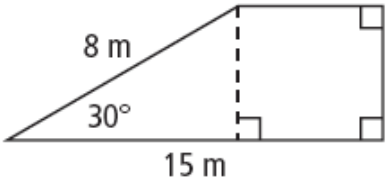


Find the area of each trapezoid to the nearest tenth.

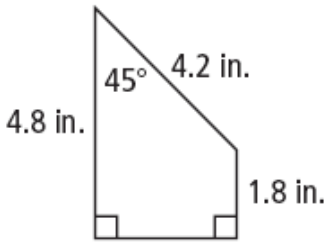
8.



22.



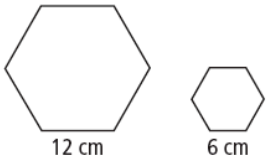
23.



10-4 Perimeters and Areas of Similar Figures NAME: _____

Problem

The hexagons at the right are similar. What is the ratio (smaller to larger) of their perimeters and their areas?



The ratio of the corresponding sides is $\frac{6}{12}$.

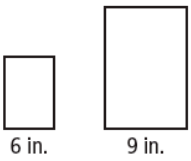
$\frac{P_{\text{smaller}}}{P_{\text{larger}}} = \frac{6}{12} = \frac{1}{2}$ Simplify.

The ratio of the areas is the square of the ratio of the corresponding sides.

$\frac{A_{\text{smaller}}}{A_{\text{larger}}} = \frac{1^2}{2^2} = \frac{1}{4}$

Problem

The rectangles at the right are similar. The area of the smaller rectangle is 72 in.^{2}. What is the area of the larger rectangle?



The ratio of corresponding sides is $\frac{a}{b} = \frac{6}{9} = \frac{2}{3}$.

Set up a proportion and solve:

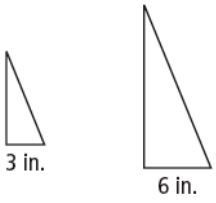
$\frac{A_{\text{smaller}}}{A_{\text{larger}}} = \frac{a^2}{b^2}$

$\frac{72}{A_{\text{larger}}} = \frac{2^2}{3^2}$ Substitute.

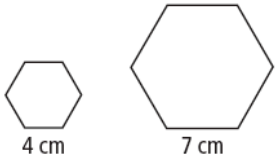
$A_{\text{larger}} = 72(\frac{9}{4}) = 162 \text{ in.}^2$ Cross Products Property

The figures in each pair are similar. Compare the first figure to the second. Give the ratio of the perimeters and the ratio of the areas.

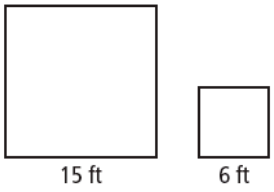
1.



2.

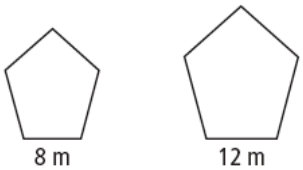


3.



The figures in each pair are similar. The area of one figure is given. Find the area of the other figure to the nearest whole number.

4.

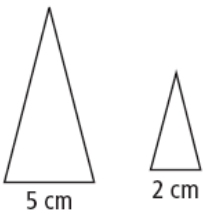


Area of smaller pentagon $= 112 \text{ m}^2$

5.

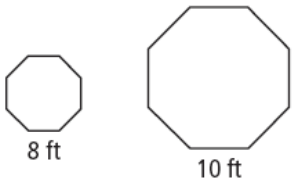
Area of smaller rectangle $= 78 \text{ in.}^2$

6.



Area of larger triangle $= 75 \text{ cm}^2$

7.



Area of smaller octagon $= 288 \text{ ft}^2$