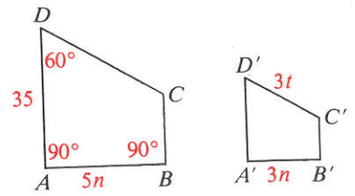
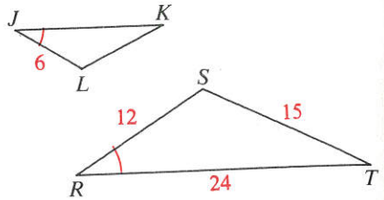
5. If the corresponding angles of two polygons are congruent, must the polygons be similar?
6. If the corresponding sides of two polygons are in proportion, must the polygons be similar?
7. Two polygons are similar. Do they have to be congruent?
8. Two polygons are congruent. Do they have to be similar?
9. Are all regular pentagons similar?
10. Are all isosceles right triangles similar?

11. Quad. $ABCD \sim$ quad. $A'B'C'D'$. Complete.
   a. $m\angle C' =$? b. $A'D' =$?
   c. $DC =$? d. Quad. $CBAD \sim$?
   e. Explain why
   quad. $ABCD \sim$ quad. $B'C'D'A'$
   is not a correct statement.



12. The lengths of the sides of a quadrilateral are 4, 6, 6, and 8. The lengths of the sides of a similar quadrilateral are 6, 9, 9, and 12.
   a. What is the scale factor?
   b. What are the perimeters of the two quadrilaterals?
   c. What is the ratio of the perimeters?

13. The triangles are similar. Complete.
   a. $\triangle RST \sim$?
   b. The scale factor is ?.
   c. $JK =$? and $KL =$?
   d. The perimeter of $\triangle JKL$ is ?.
   The perimeter of $\triangle RST$ is ?.
   e. The ratio of the perimeters is ?.



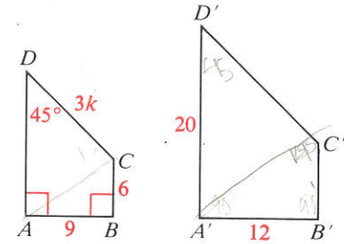
Written Exercises

Tell whether the two polygons are *always*, *sometimes*, or *never* similar.

A
1. Two equilateral triangles
2. Two right triangles
3. Two isosceles triangles
4. Two scalene triangles
5. Two squares
6. Two rectangles
7. Two rhombuses
8. Two isosceles trapezoids
9. A right triangle and an acute triangle
10. An isosceles triangle and a scalene triangle
11. A right triangle and a scalene triangle
12. An equilateral triangle and an equiangular triangle

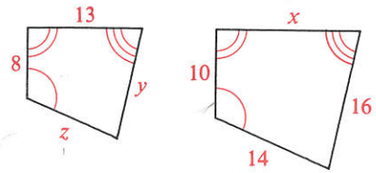
In Exercises 13–20, quad. $ABCD \sim$ quad. $A'B'C'D'$.

13. What is the scale factor of quad. $ABCD$ to quad. $A'B'C'D'$?
14. What special kind of figure must quad. $A'B'C'D'$ be? Explain.
15. Find $m\angle D'$.
16. Find $m\angle C'$.
17. Find $B'C'$.
18. Find AD.
19. Find $C'D'$.
20. Find the ratio of the perimeters.

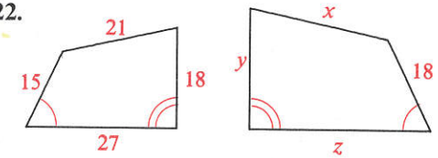


Two similar polygons are shown. Find the values of x, y, and z. (In Exercise 23 find the values of x and y.)

B
21.



22.



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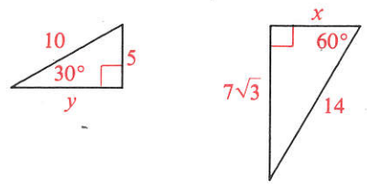

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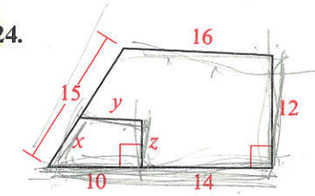
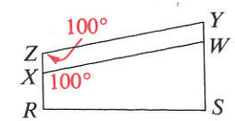
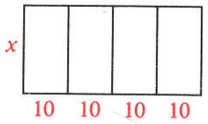


25. Draw two equilateral hexagons that are clearly not similar.
26. Draw two equiangular hexagons that are clearly not similar.
27. If $\triangle ABC \sim \triangle DEF$, express AB in terms of other lengths. (There are two possible answers.)
28. Explain how you can tell at once that quadrilateral $RSWX$ is not similar to quadrilateral $RSYZ$.

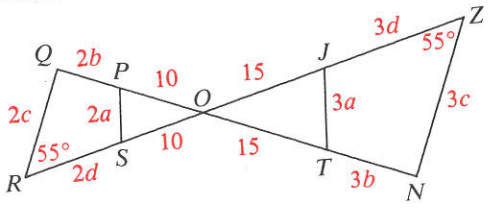


Plot the given points on graph paper. Draw quadrilateral $ABCD$ and $\overline{A'B'}$. Locate points C' and D' so that $A'B'C'D'$ is similar to $ABCD$.

29. $A(0, 0)$, $B(4, 0)$, $C(2, 4)$, $D(0, 2)$, $A'(-10, -2)$, $B'(-2, -2)$
30. $A(0, 0)$, $B(4, 0)$, $C(2, 4)$, $D(0, 2)$, $A'(7, 2)$, $B'(7, 0)$
31. The card shown was cut into four congruent pieces with each piece similar to the original. Find the value of x.



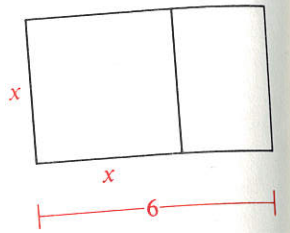
C **32.** What can you deduce from the diagram shown below? Explain.



33. The large rectangle shown is a *golden rectangle*. This means that when a square is cut off, the rectangle that remains is similar to the original rectangle.

a. How wide is the original rectangle?

b. The ratio of length to width in a golden rectangle is called the *golden ratio*. Write the golden ratio in simplified radical form. Then use a calculator to find an approximation to the nearest hundredth.



Self-Test 1

Express the ratio in simplest form.

1. 9:15

2. 60 cm to 2 m

3. $\frac{4ab}{6b^2}$

Solve for x.

4. $\frac{x}{8} = \frac{9}{12}$

5. $\frac{x-2}{2} = \frac{x+6}{4}$

6. $\frac{x}{5-x} = \frac{12}{8}$

Tell whether the equation is equivalent to the proportion $\frac{a}{b} = \frac{5}{7}$.

7. $\frac{a}{7} = \frac{b}{5}$

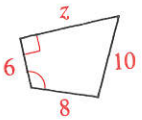
8. $7a = 5b$

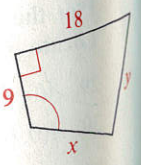
9. $\frac{a+b}{b} = \frac{12}{7}$

10. If $\triangle ABC \sim \triangle RST$, $m\angle A = 45$, and $m\angle C = 60$, then $m\angle R =$?, $m\angle S =$?, and $m\angle T =$?.

The quadrilaterals shown are similar.

11. The scale factor of the smaller quadrilateral to the larger quadrilateral is $\frac{?}{?}$.





12. $x =$?

13. $y =$?

14. $z =$?

15. The measures of the angles of a hexagon are in the ratio 5:5:5:6:7:8. Find the measures.