

Write the ratio of the first measurement to the second measurement.

9. length of a tennis racket: 2 ft 4 in.
length of a table tennis paddle: 10 in.
10. height of a tab
height of a ten

13. **Baseball** A baseball team played 154 regular season games. The ratio of the number of games they won to the number of games they lost was $\frac{5}{2}$. How many games did they win? How many games did they lose?

← See Problem 2.

14. The measures of two supplementary angles are in the ratio 5 : 7. What is the measure of the larger angle?

15. The lengths of the sides of a triangle are in the extended ratio 6 : 7 : 9. The perimeter of the triangle is 88 cm. What are the lengths of the sides?

← See Problem 3.

16. The measures of the angles of a triangle are in the extended ratio 4 : 3 : 2. What is the measure of the largest angle?

Algebra Solve each proportion.

← See Problem 4.

17. $\frac{1}{3} = \frac{x}{12}$

18. $\frac{9}{5} = \frac{3}{x}$

19. $\frac{4}{x} = \frac{5}{9}$

20. $\frac{y}{10} = \frac{15}{25}$

21. $\frac{9}{24} = \frac{12}{n}$

22. $\frac{11}{14} = \frac{b}{21}$

23. $\frac{3}{5} = \frac{6}{x+3}$

24. $\frac{y+7}{9} = \frac{8}{5}$

25. $\frac{5}{x-3} = \frac{10}{x}$

26. $\frac{n+4}{8} = \frac{n}{4}$

Algebra Solve each proportion.

40. $\frac{1}{7y-5} = \frac{2}{9y}$

41. $\frac{4a+1}{7} = \frac{2a}{3}$

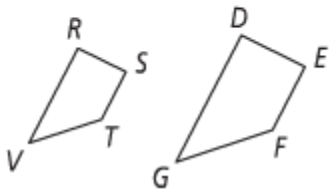
42. $\frac{5}{x+2} = \frac{3}{x+1}$

43. $\frac{2b-1}{4} = \frac{b-2}{12}$

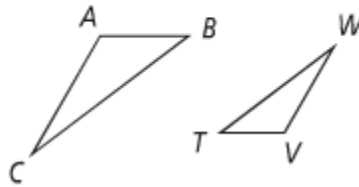
List the pairs of congruent angles and the extended proportion that relates the corresponding sides for the similar polygons.

See Problem 1

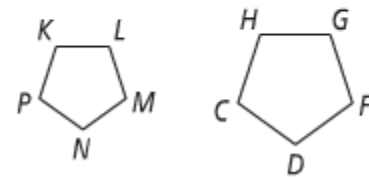
9. $RSTV \sim DEFG$



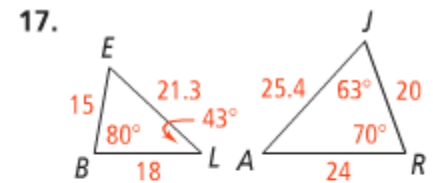
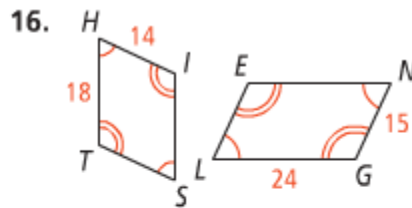
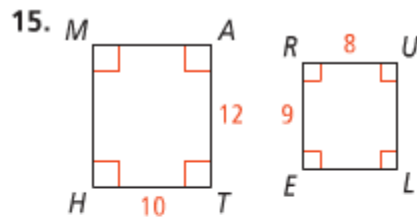
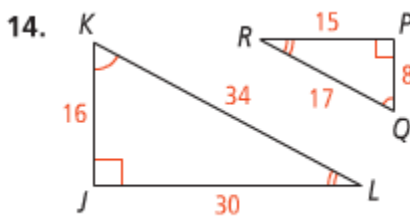
10. $\triangle CAB \sim \triangle WVT$



11. $KLMNP \sim HGFDC$

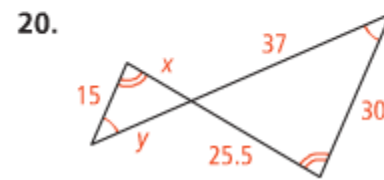
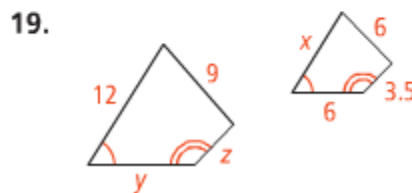
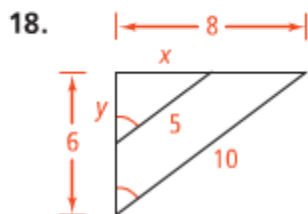


Determine whether the polygons are similar. If so, write a similarity statement and give the scale factor. If not, explain.



Algebra The polygons are similar. Find the value of each variable.

See Problem 3.



32. **Think About a Plan** The Davis family is planning to drive from San Antonio to Houston. About how far will they have to drive?
- How can you find the distance between the two cities on the map?
 - What proportion can you set up to solve the problem?

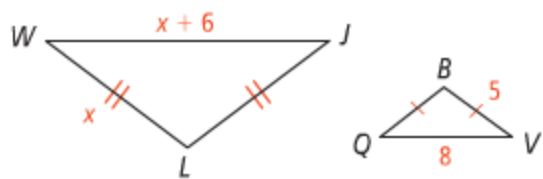
33. **Reasoning** Two polygons have corresponding side lengths that are proportional. Can you conclude that the polygons are similar? Justify your reasoning.

34. **Writing** Explain why two congruent figures must also be similar. Include scale factor in your explanation.

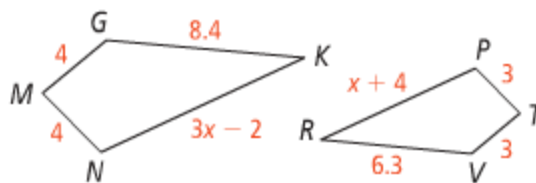


Algebra Find the value of x . Give the scale factor of the polygons.

37. $\triangle WLJ \sim \triangle QBV$

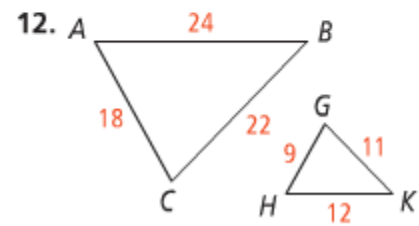
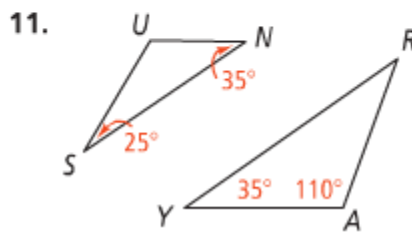
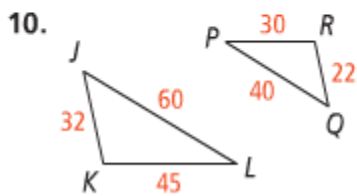
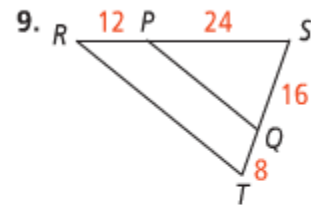
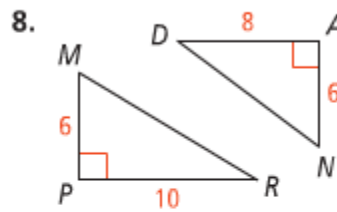
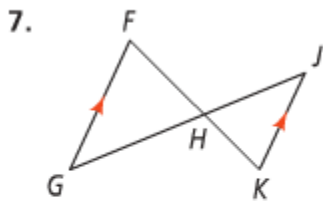


38. $GKNM \sim VRPT$



Determine whether the triangles are similar. If so, write a similarity statement and name the postulate or theorem you used. If not, explain.

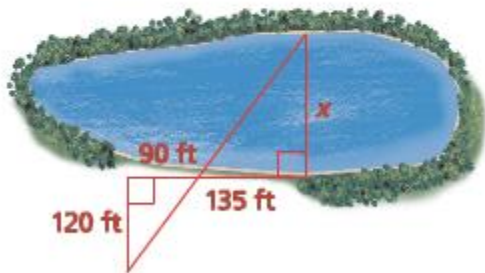
◀ See Problems 1 and 2.



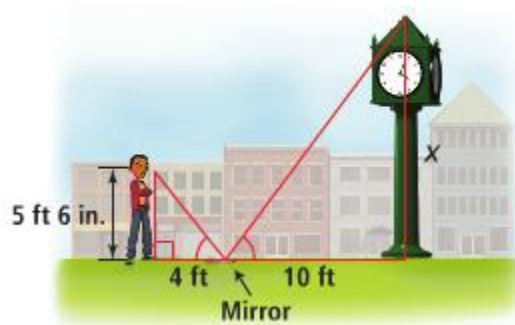
Indirect Measurement Explain why the triangles are similar. Then find the distance represented by x .

◀ See Problem 4.

15.



16.

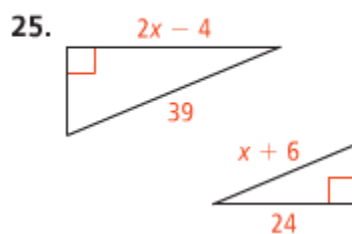
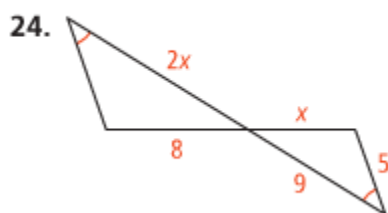


22. **Think About a Plan** On a sunny day, a classmate uses indirect measurement to find the height of a building. The building's shadow is 12 ft long and your classmate's shadow is 4 ft long. If your classmate is 5 ft tall, what is the height of the building?

- Can you draw and label a diagram to represent the situation?
- What proportion can you use to solve the problem?

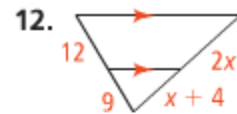
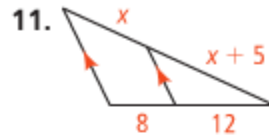
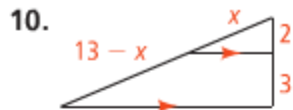
23. **Indirect Measurement** A 2-ft vertical post casts a 16-in. shadow at the same time a nearby cell phone tower casts a 120-ft shadow. How tall is the cell phone tower?

Algebra For each pair of similar triangles, find the value of x .



Algebra Solve for x .

← See Problem 1.

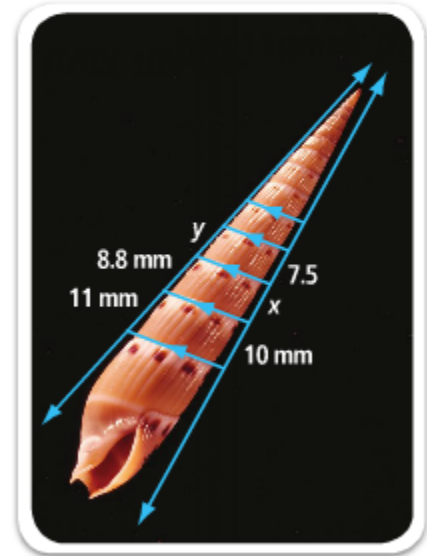


Marine Biology Use the information shown on the auger shell.

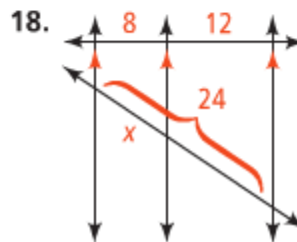
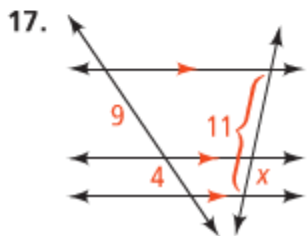
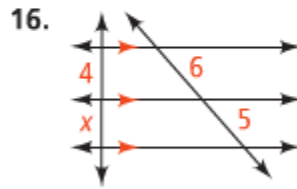
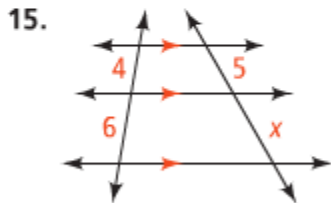
← See Problem 2.

13. What is the value of x ?

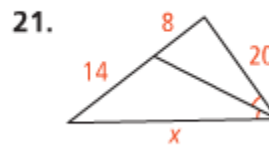
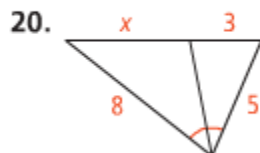
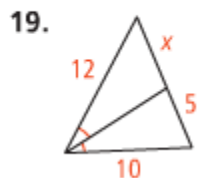
14. What is the value of y ?



Algebra Solve for x .



Algebra Solve for x .



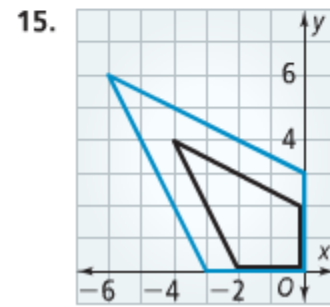
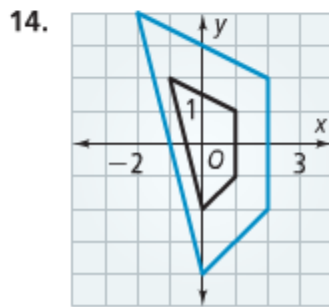
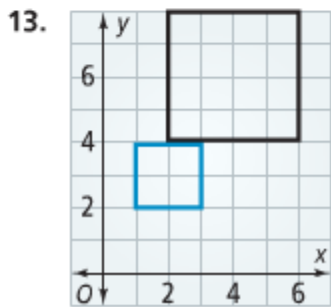
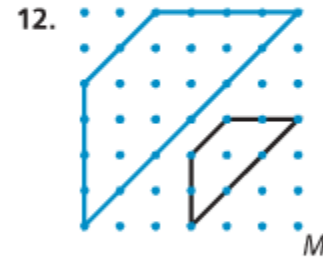
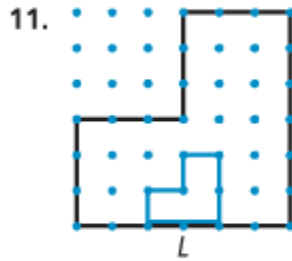
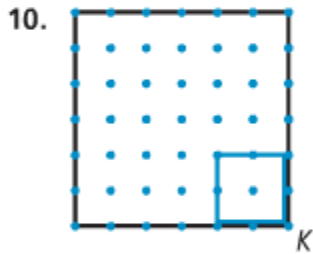
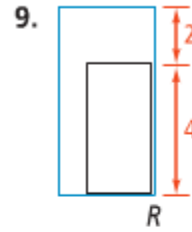
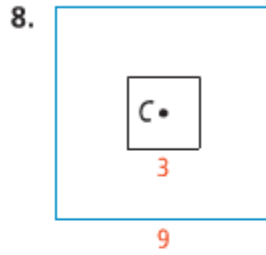
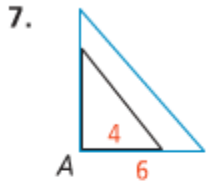
Urban Design In Washington, D.C., E. Capitol Street, Independence Avenue, C Street, and D Street are parallel streets that intersect Kentucky Avenue and 12th Street.

31. How long (to the nearest foot) is Kentucky Avenue between C Street and D Street?
32. How long (to the nearest foot) is Kentucky Avenue between E. Capitol Street and Independence Avenue?



The blue figure is a dilation image of the black figure. The labeled point is the center of dilation. Tell whether the dilation is an enlargement or a reduction. Then find the scale factor of the dilation.

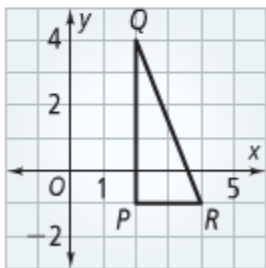
← See Problem 1.



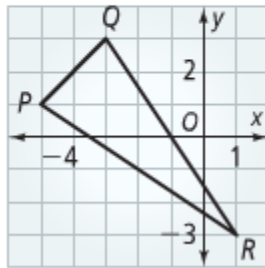
Find the images of the vertices of $\triangle PQR$ for a dilation with center $(0, 0)$ and the given scale factor. Graph the image.

← See Problem 2.

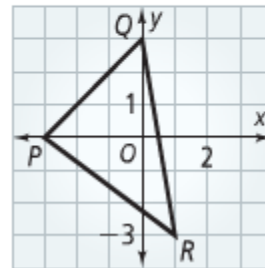
16. scale factor 3



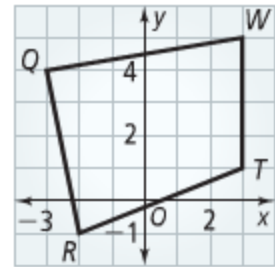
17. scale factor 10



18. scale factor $\frac{3}{4}$



Use the graph at the right. Find the vertices of the image of $QRTW$ for a dilation with center $(0, 0)$ and the given scale factor.



29. $\frac{1}{4}$ 30. 0.6 31. 0.9 32. 10 33. 100

34. **Compare and Contrast** Compare the definition of scale factor of a dilation to the definition of scale factor of two similar polygons. How are they alike? How are they different?

Coordinate Geometry Graph $MNPQ$ and its image $M'N'P'Q'$ for a dilation with center $(0, 0)$ and the given scale factor.

37. $M(1, 3), N(-3, 3), P(-5, -3), Q(-1, -3); 3$ 38. $M(2, 6), N(-4, 10), P(-4, -8), Q(-2, -12); \frac{1}{4}$

Reasoning Write *true* or *false* for Exercises 49–52. Explain your answers.

49. A dilation is an isometry.
50. A dilation with a scale factor greater than 1 is a reduction.
51. For a dilation, corresponding angles of the image and preimage are congruent.
52. A dilation image cannot have any points in common with its preimage.