



- I can use proportions to identify similar polygons.
- I can use similar polygons to solve problems.

Similar polygons are polygons that have the same shape but not necessarily the same size.

Similar Polygons	
<p style="text-align: center;">$\triangle ABC \sim \triangle DEF$</p>	<p>Corresponding angles are congruent.</p> <p style="text-align: center;">$\angle A \cong \angle D$ $\angle B \cong \angle E$ $\angle C \cong \angle F$</p> <p>Corresponding sides are proportional.</p> <p style="text-align: center;">$\frac{AB}{DE} = \frac{6}{3} = 2$ $\frac{BC}{EF} = \frac{9}{4.5} = 2$ $\frac{CA}{FD} = \frac{10}{5} = 2$</p>

A **similarity ratio**, also called the **scale factor** is the ratio of the lengths of corresponding sides.

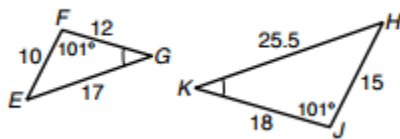
→ In the diagram above, for the similarity statement $\triangle ABC \sim \triangle DEF$, the similarity ratio is: _____.

→ In the diagram above, for the similarity statement $\triangle DEF \sim \triangle ABC$, the similarity ratio is: _____.

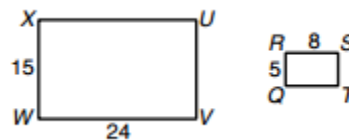
Example 1:

Determine whether the polygons are similar. If so, write the scale factor (similarity ratio) and a similarity statement.

a) $\triangle EFG$ and $\triangle HJK$

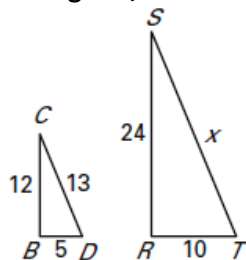


b) rectangles $QRST$ and $UVWX$



Example 2:

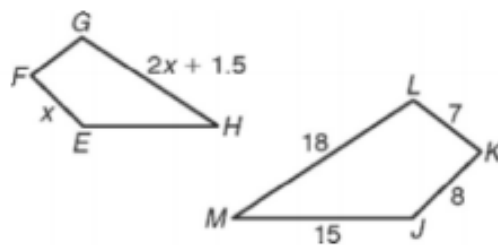
In the diagram, $\triangle BCD \sim \triangle RST$. Please solve for x .



✓ **Checkpoint**

In the diagram, $EFGH \sim JKLM$

1) Find the value of x .



2) What is the scale factor of $EFGH$ to $JKLM$?

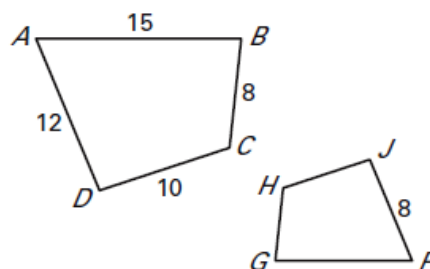
Perimeters of Similar Polygons Theorem	
<p>If two polygons are similar, and their similarity ratio is $\frac{a}{b}$, then the ratio of their perimeters is $\frac{a}{b}$.</p>	<div style="text-align: center;"> <p>$\triangle ABC \sim \triangle DEF$</p> <p>$\frac{AB}{DE} = \frac{BC}{EF} = \frac{CA}{FD} = \frac{3}{1}$</p> <p>$\frac{\text{perimeter of } \triangle ABC}{\text{perimeter of } \triangle DEF} = \frac{36}{12} = \frac{3}{1}$</p> </div>

Example 3:

In the diagram, $ABCD \sim FGHI$.

a) Find the scale factor of $FGHI$ to $ABCD$.

b) Find the perimeter of $FGHI$.



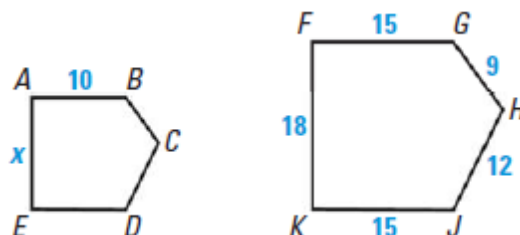
✓ **Checkpoint**

3) In the diagram, $ABCDE \sim FGHIK$.

a) Find the scale factor of $FGHIK$ to $ABCDE$.

b) Find the value of x .

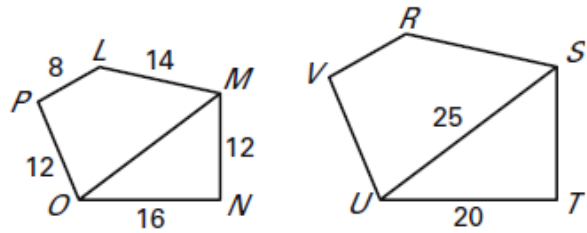
c) Find the perimeter of $ABCDE$.



Example 4:

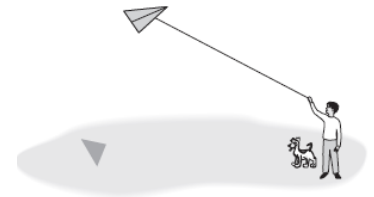
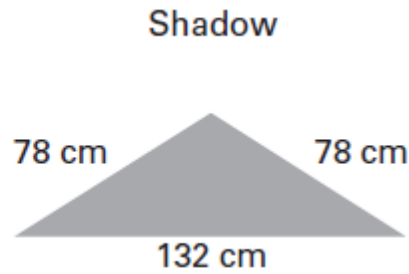
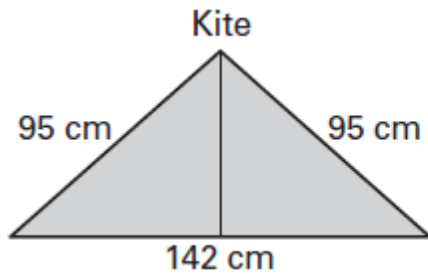
In the diagram, $LMNOP \sim RSTUV$.

- Find the scale factor of $RSTUV$ to $LMNOP$.
- Find the perimeter of $RSTUV$.
- Find the length of diagonal \overline{MO} .



Example 5: Applications!

- You are flying a kite on a sunny day. The kite has side lengths shown in the figure below at the left. The kite's shadow has the side lengths shown in the figure below at the right.



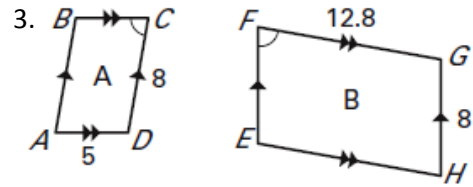
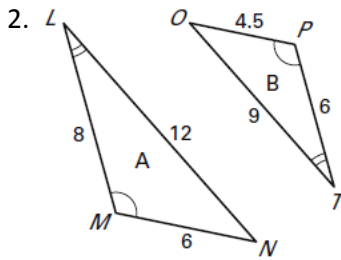
Is the shadow similar to the kite? *Explain* your reasoning.

- The community park has a rectangular swimming pool enclosed by a rectangular fence for sunbathing. The shape of the pool is similar to the shape of the fence. The pool is 30 feet wide. The fence is 50 feet wide and 100 feet long.
 - What is the scale factor of the pool to the fence?
 - What is the length of the pool?
 - Find the area reserved strictly for sunbathing.

List all pairs of congruent angles for the polygons. Then write the ratios of the corresponding sides in a statement of proportionality.

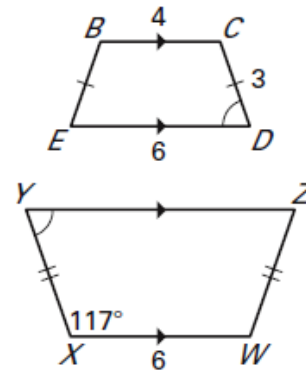
1. Quadrilateral $CDEF$: quadrilateral $MNKL$

Determine whether the polygons are similar. If they are, write a similarity statement and find the scale factor of Figure A to Figure B.



In the diagram at the right, quadrilateral $BCDE$: quadrilateral $WXYZ$.

4. Find the scale factor of $BCDE$ to $WXYZ$.
5. Find the scale factor of $WXYZ$ to $BCDE$.
6. Find XY .
7. Find $m\angle C$.
8. Find the perimeter of quadrilateral $WXYZ$.



Use the given information to find the indicated value.

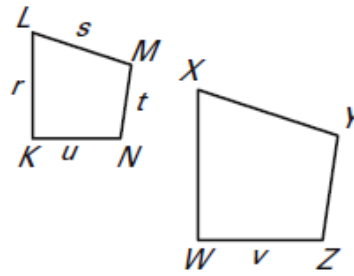
9. Given: $\triangle CDX \sim \triangle GNZ$, the perimeter of $\triangle CDX$ is 48 feet, $CX = 14$ feet, and $GZ = 58.8$ feet. Find the perimeter of $\triangle GNZ$
10. Given: $\triangle ABC \sim \triangle DEF$, $\triangle ABC$ is isosceles, $\triangle ABC$ has a perimeter of 18 inches and a leg length of 5 inches, and the base of $\triangle DEF$ is 34.4 inches long. Find the perimeter of $\triangle DEF$.

Quadrilateral $KLMN$: quadrilateral $WXYZ$. Find the indicated lengths in terms of r , s , t , u , and v .

11. WX

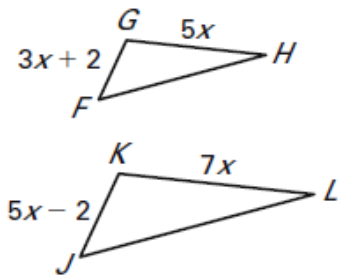
12. XY

13. YZ

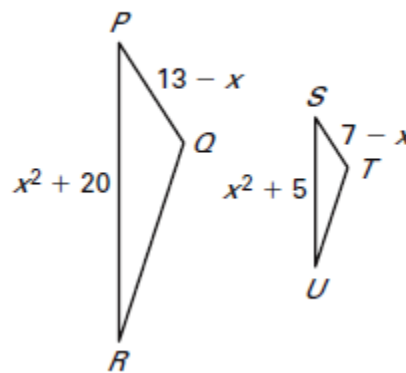


Find all possible values of x in the similar triangles.

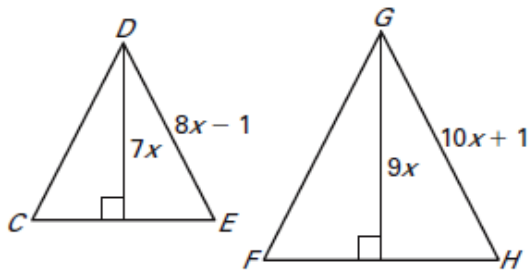
14. $\triangle FGH \sim \triangle JKL$



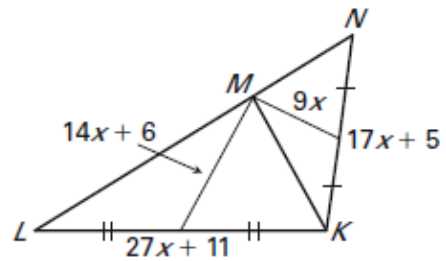
15. $\triangle PQR \sim \triangle STU$



16. $\triangle CDE \sim \triangle FGH$



17. $\triangle LMK \sim \triangle KMN$



Answer Key

Lesson 6.3

- $\angle C \cong \angle M, \angle D \cong \angle N, \angle E \cong \angle K, \angle F \cong \angle L;$
$$\frac{CD}{MN} = \frac{DE}{NK} = \frac{EF}{KL} = \frac{CF}{ML}$$
- $\triangle LNM \sim \triangle TPO; \frac{4}{3}$
- quadrilateral $ABCD \sim$ quadrilateral $HEFG; \frac{5}{8}$
- $\frac{2}{3}$
- $\frac{3}{2}$
- 4.5
- 117°
- 24
- 201.6 ft
- 77.4 in.
- $\frac{rv}{u}$
- $\frac{sv}{u}$
- $\frac{tv}{u}$
- 6
- 5, 2.5
- 8
- 15