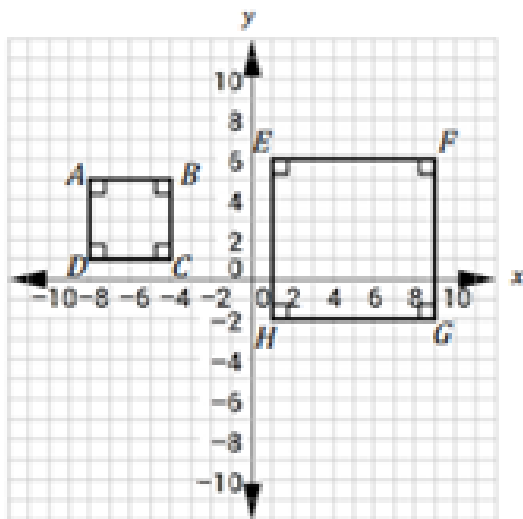


- Dilation is the type of transformation that results in similar figures.
- Similarity preserves congruence of corresponding angles.
- Similarity maintains the proportionality of corresponding sides.

Congruent Triangles are always similar triangles.

Similar Triangles are sometimes congruent triangles.



Based on the two similar squares above, name the properties of similar polygons, and give the justifications that prove the figures are similar.

#	Properties	Justifications
1.	same shape	both sq.
2.	Dilation	2x larger
3.	corr \angle 's \cong	all 90°
4.	corr sides are prop	$\frac{1}{2} = \frac{1}{2} = \frac{1}{2} = \frac{1}{2}$

Each corresponding side of a polygon can be multiplied by the scale factor to get the length of its corresponding side on a similar polygon. Then, the ratio of the areas is the square of the scale factor while the ratio of perimeter is the scale factor.

Side to side

$$a \div b$$

ratio area

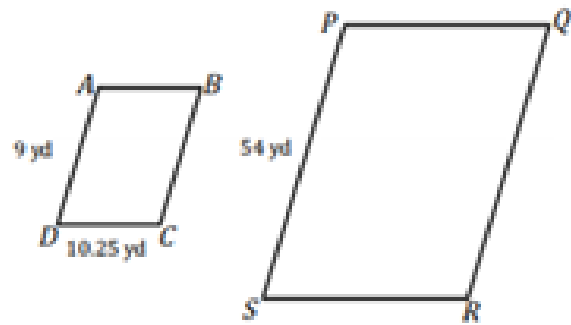
$$a^2 \div b^2$$

perimeter ratio

$$a \div b$$

Example:

Parallelograms ABCD and PQRS are similar.



a.) What is the scale factor from PQRS to ABCD?

$$\frac{54}{9} = 6$$

b.) What is the length of \overline{RS} ?

$$10.25(6) = 61.5 \text{ yd}$$

Example:

Mrs. Kemp's rectangular garden has a length of 20 meters and a width of 15 meters. Her neighbor, Mr. Pippen, has a garden similar in shape with a scale factor of 3.

- a.) What is the width of Mr. Pippen's garden?

$$15(3) = 45 \text{ m}$$

- b.) How do the areas of the gardens relate to one another?

$$a^2 = b^2$$

$$3^2 = 1^2$$

$$9 = 1$$

Example:

A right triangle has a base of 11 yards and a height of 7 yards. If you were to construct a similar but not congruent right triangle with area of 616 square yards, what would the dimensions of the new triangle be?

$$A = \frac{1}{2}(11)(7) \\ = 38.5$$

$$\frac{616}{38.5} = \frac{\sqrt{16}}{\sqrt{1}} = \frac{a^2}{b^2} \\ = \frac{4}{1}$$

$$11(4) = 44 \text{ yd} \\ 7(4) = 28 \text{ yd}$$

Example:

The areas of two similar polygons are in the ratio of 25:81. Find the ratio for the corresponding sides.

$$\frac{\sqrt{25}}{\sqrt{81}} = \frac{a^2}{b^2} \quad \left(\frac{5}{9} \right)$$

You try:

Triangle $\triangle TOY$ is similar to triangle $\triangle GAL$. \overline{TO} is 10 inches long, \overline{OY} is 6 inches long, \overline{GA} is 16 inches long, and \overline{GL} is 13.8 inches long. How long is \overline{TY} ?

$$\frac{10}{16} = 0.625$$

$$13.8 (0.625) = 8.625$$

You try:

1. Which transformation would result in the perimeter of a polygon being different from the perimeter of its pre-image?

- (A) $(x, y) \rightarrow (-x, -y)$
- (B) $(x, y) \rightarrow (y, x)$
- (C) $(x, y) \rightarrow (3x, 3y)$
- (D) $(x, y) \rightarrow (x - 3, y + 1)$