

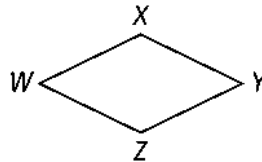
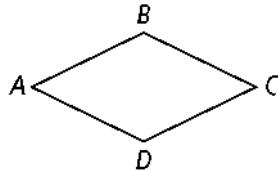
UNIT 4
ASSIGNMENT #5

Similar Polygons

OBJECTIVE: S.W.B.A.T. make statements about similar polygons

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

1. $ABCD \sim WXYZ$



$$\begin{aligned}\angle A &\sim \angle W \\ \angle B &\sim \angle X \\ \angle C &\sim \angle Y \\ \angle D &\sim \angle Z\end{aligned}$$

$$\frac{AB}{BC} = \frac{WX}{XY}$$

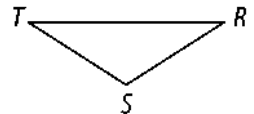
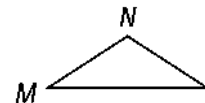
this is just one proportion

$$\begin{aligned}\angle M &\sim \angle R \\ \angle N &\sim \angle S \\ \angle O &\sim \angle T\end{aligned}$$

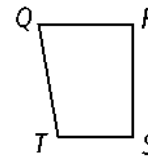
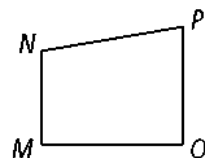
$$\frac{MN}{NO} = \frac{RS}{ST}$$

this is just one proportion

2. $\triangle MNO \sim \triangle RST$



3. $NPOM \sim TQRS$

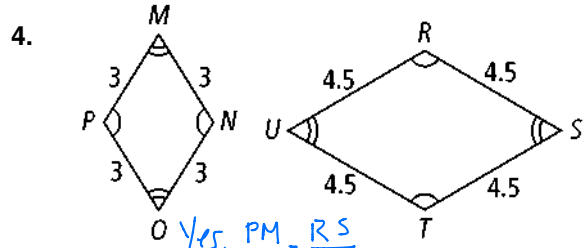


$$\begin{aligned}\angle N &\sim \angle T \\ \angle P &\sim \angle Q \\ \angle O &\sim \angle R \\ \angle M &\sim \angle S\end{aligned}$$

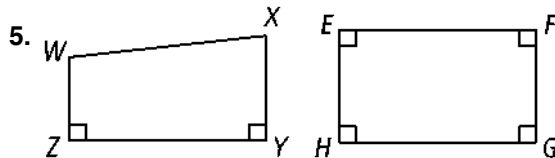
$$\frac{NP}{MO} = \frac{TQ}{SR}$$

this is just one proportion

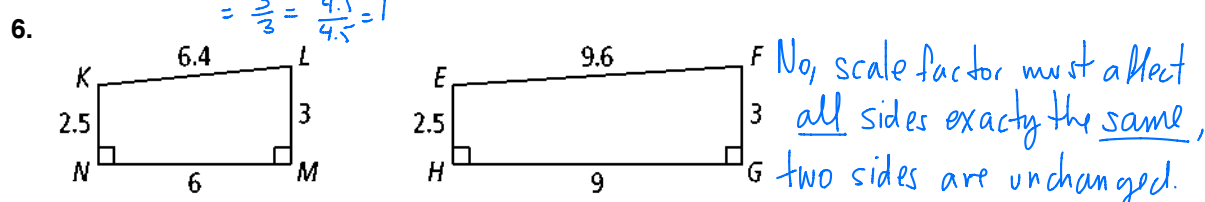
Determine whether the polygons are similar. If so, write a similarity statement and give the scale factor. If not, explain.



Yes, $\frac{PM}{MN} = \frac{RS}{ST}$
 $= \frac{3}{3} = \frac{4.5}{4.5} = 1$



No, AA similarity only applies to triangles.



No, scale factor must affect all sides exactly the same, two sides are unchanged.

Determine whether the polygons are similar.

- an equilateral triangle with side length 6 and an equilateral triangle with side length 15
Yes, scale factor is 6:15 for all sides, therefore SSS similarity
- a triangle with side lengths 3 cm, 4 cm, and 5 cm, and a triangle with side lengths 18 cm, 19 cm, and 20 cm
No, scale factor not the same
- a square with side length 4 and a rectangle with width 8 and length 8.5
No, scale factor not the same for all sides
- a rhombus with side lengths 8 and consecutive angles 50° and 130° , and a rhombus with side lengths 13 and consecutive angles 50° and 130°
Yes, AA similarity

11. An architect is making a scale drawing of a building. She uses the scale 1 in. = 15 ft.

a. If the building is 48 ft tall, how tall should the scale drawing be?

$$\frac{1}{48} = \frac{x}{15} \Rightarrow \frac{(1)(15)}{48} = \frac{48x}{48} \Rightarrow x = 0.31 \text{ in}$$

b. If the building is 90 ft wide, how wide should the scale drawing be?

$$\frac{1}{48} = \frac{x}{90} \Rightarrow \frac{(1)(90)}{48} = \frac{48x}{48} \Rightarrow x = 1.88 \text{ in}$$

12. A scale drawing of a building was made using the scale 15 cm = 120 ft. If the scale drawing is 45 cm tall, how tall is the actual building?

$$\frac{15}{120} = \frac{45}{x} \Rightarrow \frac{15x}{15} = \frac{(120)(45)}{15} \Rightarrow x = 360 \text{ ft}$$

Determine whether each statement is *always*, *sometimes*, or *never* true.

13. Two squares are similar.

always

14. Two hexagons are similar.

Sometimes (could have 2 hexagons w/ all different angles + sides)

15. Two similar triangles are congruent.

Sometimes

16. A rhombus and a pentagon are similar.

never (different shapes)

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

17. $ABCD \sim TSVU$

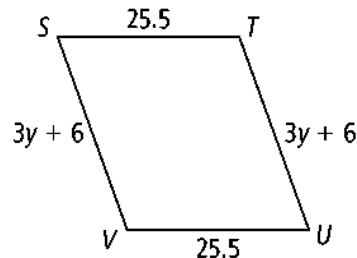
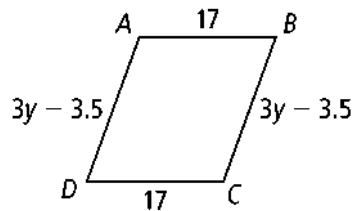
$$\frac{3y - 3.5}{17} = \frac{3y + 6}{25.5}$$

$$25.5(3y - 3.5) = 17(3y + 6)$$

$$76.5y - 89.25 = 51y + 102$$

$$-51y + 89.25 = -81y + 89.25$$

$$\frac{25.5y}{25.5} = \frac{191.25}{25.5} \Rightarrow y = 7.5$$



18. The scale factor of $RSTU$ to $VWXY$ is 14 : 3. What is the scale factor of $VWXY$ to $RSTU$?

3 : 14

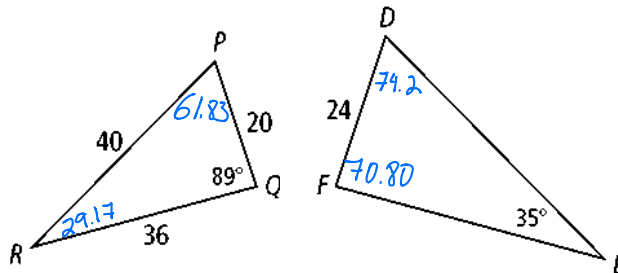
In the diagram below, $\triangle PRQ \sim \triangle DEF$. Find each of the following.

19. the scale factor of $\triangle PRQ$ to $\triangle DEF$

$$\frac{PR}{DE} = \frac{RQ}{EF} = \frac{QP}{FD}$$

$$\frac{40}{24} = \frac{36}{24} = \frac{20}{24}$$

SO, scale factor is 5 : 6



20. $m\angle D = 74.2$

$$\frac{5}{6} = \frac{61.83}{x}$$

21. $m\angle R = 29.17$

$$\frac{5}{6} = \frac{x}{35}$$

22. $m\angle P = 61.83$

23. $DE = 48$

$$\frac{20}{24} = \frac{40}{x}$$

24. $FE = 43.2$

$$\frac{20}{24} = \frac{36}{x}$$

25. **Writing** Explain why all isosceles right triangles are similar, but not all scalene right triangles are similar.

For a right isosceles triangle, the angle measurements are 45:45:90--this is the only one possible, therefore all right isosceles triangles are similar due to the AA similarity. All scalene triangles may not be similar because the angle measures are all different, therefore all sides are different. This means that for them to be similar the scale factor must work for all sides and angles--this does not work on all cases because they are scalene. **NOTE: remember isosceles triangles are all similar, but not necessarily congruent.**