

Geometry

7.2: Similar Polygons

Name: _____



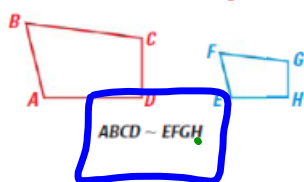
Students will be able to determine if 2 figures are similar and find missing parts of similar figures.

Two polygons are similar polygons if

reduced or
enlarged copy

Corresponding angles are \cong
and

Corresponding sides are proportional



Corresponding Angles

$$\begin{aligned}\angle A &\cong \angle E \\ \angle B &\cong \angle F \\ \angle C &\cong \angle G \\ \angle D &\cong \angle H\end{aligned}$$

Ratios of Corresponding Sides

$$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{AD}{EH}$$

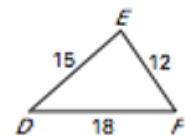
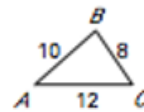
Scale factor-

If 2 polygons are similar, scale factor
is the ratio of corresponding side lengths

Example 1: In the diagram, $\triangle ABC \sim \triangle DEF$.

- a. List all pairs of congruent angles

$$\angle A \cong \angle D, \angle B \cong \angle E, \angle C \cong \angle F$$



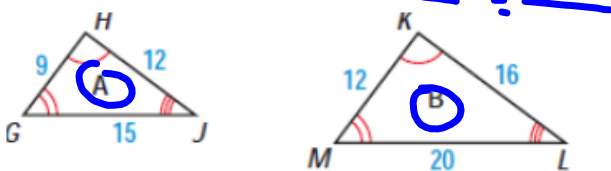
- b. Check that the ratios of corresponding side lengths are equal

$$\frac{AB}{DE} = \frac{10}{15} = \boxed{\frac{2}{3}} \quad \frac{BC}{EF} = \frac{8}{12} = \boxed{\frac{2}{3}} \quad \frac{AC}{DF} = \frac{12}{18} = \boxed{\frac{2}{3}}$$

- c. Write the ratios of the corresponding side lengths in a statement of proportionality.

$$\frac{AB}{DE} = \frac{BC}{EF} = \frac{AC}{DF}$$

Example 2: Determine whether the triangles are similar. If they are similar, write a similarity statement and find the scale factor of Figure B to Figure A.



$$\triangle KML \sim \triangle HGF$$

$$\frac{KM}{HG} = \frac{12}{9} = \boxed{\frac{4}{3}}$$

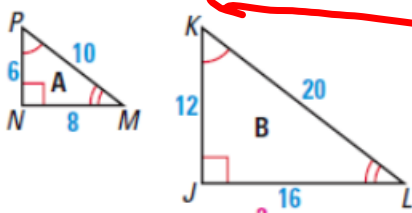
$$\frac{KL}{HF} = \frac{16}{12} = \boxed{\frac{4}{3}}$$

$$\frac{ML}{GF} = \frac{20}{15} = \boxed{\frac{4}{3}}$$

SCALE FACTOR

$$\boxed{4:3}$$

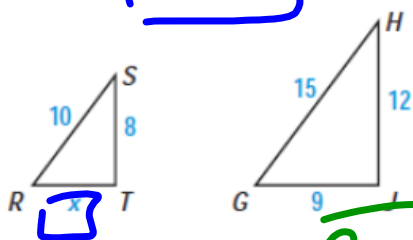
Try: Determine whether the triangles are similar. If they are similar, write a similarity statement and find the scale factor of Figure B to Figure A.



$$\frac{B}{A} \quad \frac{20}{10} = \frac{16}{8} = \frac{12}{6} = \boxed{\frac{2}{1}} \leftarrow \text{S.F.}$$

$$\triangle KJL \sim \triangle PNM$$

Example 3 $\triangle RST \sim \triangle GHJ$. Find the value of x .



$$\frac{10}{15} = \frac{x}{9}$$

$$\frac{2}{3} = \frac{x}{9}$$

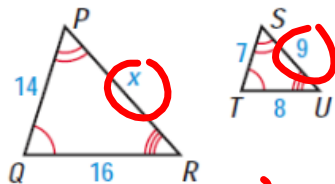
$$10 \cdot 9 = 15x$$

$$90 = 15x$$

$$\frac{90}{15} = \frac{15x}{15}$$

$$x = 6$$

Try: $\triangle PQR \sim \triangle STU$. Find the value of x .

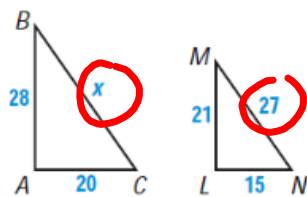


$$\frac{14}{7} = \frac{x}{9}$$

$$\frac{x}{9} = \frac{16}{8}$$

$$x = 18$$

Example 4: $\triangle ABC \sim \triangle LMN$. Find the value of x .



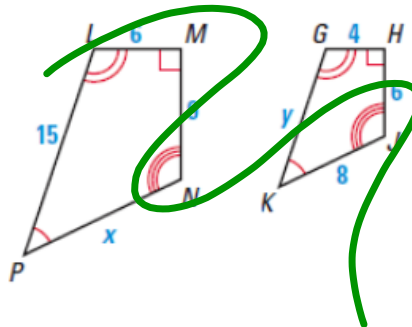
$$\frac{x}{27} = \frac{20}{15} = \frac{4}{3}$$

$$3x = 4 \cdot 27$$

$$\frac{x}{27} = \frac{4}{3}$$

$$x = 36$$

Try: $LMNP \sim GHJK$. Find the values of x and y .

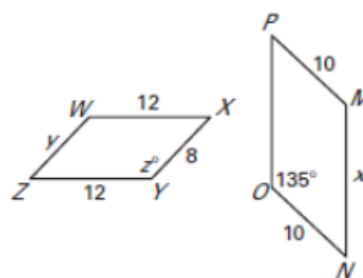


Example 4: In the diagram, $WXYZ \sim MNOP$

a. Find the scale factor of $WXYZ$ to $MNOP$

$$\frac{XY}{NO} = \frac{8}{10} = \boxed{\frac{4}{5}}$$

b. Find the values of x , y and z



$$\frac{4}{5} = \frac{12}{x} \quad \text{X} = 15$$

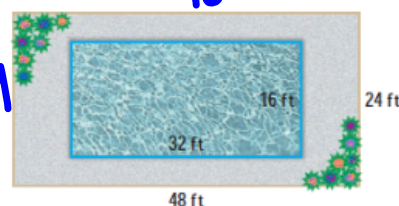
$$\frac{4}{5} = \frac{y}{10} \quad \text{y} = 8$$

$$\text{Z} = 135$$

Example 5: The outlines of a pool and a patio around the pool are similar rectangles. 48

a. Find the ratio of the length of the patio to the length of the pool.

$$\frac{48 \text{ ft}}{32 \text{ ft}} = \frac{12}{8} = \frac{3}{2} = \boxed{\frac{3}{2}} \quad \text{--- } 24$$



b. Find the ratio of the perimeter of the patio to the perimeter of the pool.

$$\text{Patio: } 48 + 48 + 24 + 24 = \boxed{144 \text{ ft}}$$

$$\text{Pool: } 32 + 32 + 16 + 16 = \boxed{96 \text{ ft}}$$

$$\frac{144}{96} = \frac{12}{8} = \boxed{\frac{3}{2}}$$

Perimeter of Similar Polygons

If two polygons are similar, then the ratio of their perimeters is EQUAL to the ratio of their corresponding side lengths.



Homework: pg. 368-370: #9 -19 odds, 22-27