Name: Date: Period:

Similar Polygons

Lesson Objective WBAT identify corresp. parts in similar figures; determine if 2 polygons are similar

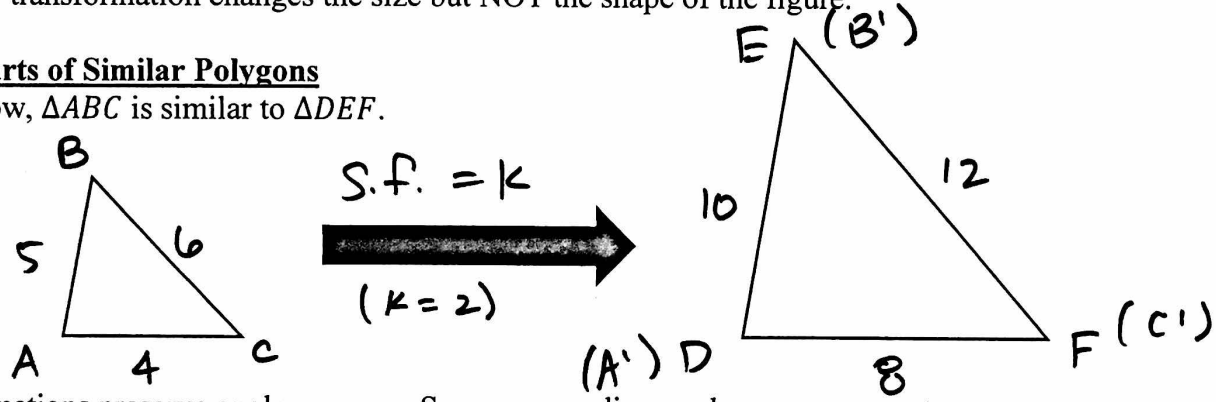
Recall from Chapter 4 that two geometric figures are *similar figures* if and only if there is a *similarity transformation* that maps one figure onto the other.

Review of Key Concepts from that unit:

- There is a scale factor, k, that enlarges or reduces the shape.
- If $|k| > 1$ → enlargement
- If $0 < |k| < 1$ → reduction
- A similarity transformation changes the size but NOT the shape of the figure.

Corresponding Parts of Similar Polygons

In the diagram below, ΔABC is similar to ΔDEF.



Similarity transformations preserve angle measure. So, corresponding angles are congruent.

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

The scale factor, k, that enlarges or reduces the figure, keeps corresponding side lengths proportional.

$$\frac{DE}{AB} = \frac{EF}{BC} = \frac{DF}{AC}$$ ← "statement of proportionality"

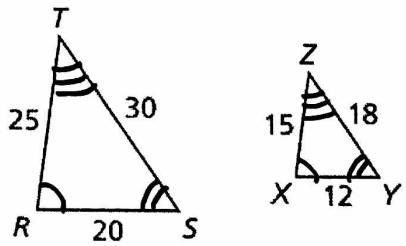
Similarity Statements: You can write "ΔABC is similar to ΔDEF" as $\Delta ABC \sim \Delta DEF$

Example:

1. In the diagram, $\Delta RST \sim \Delta XYZ$.
   a. List all pairs of corresponding, congruent angles.

$\angle R \cong \angle X$

$\angle S \cong \angle Y$ $\angle Z \cong \angle T$



   b. Write the ratios of the corresponding side lengths in a *statement of proportionality*.

$$\frac{RT}{XZ} = \frac{ST}{YZ} = \frac{RS}{XY} \quad \left(\text{or } \frac{XZ}{RT} = \frac{YZ}{ST} = \frac{XY}{RS}\right)$$

   c. Find the scale factor from ΔRST to ΔXYZ using the ratios from part (b)

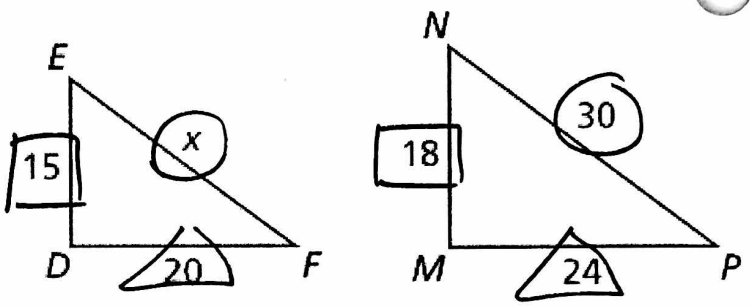
$\frac{5}{3}$ $\left(\text{or } \frac{3}{5}\right)$

Corresponding Lengths in Similar Polygons

If two polygons are similar, then the ratio of ANY two corresponding lengths in the polygons is equal to the scale factor of the similar polygons.

Example:

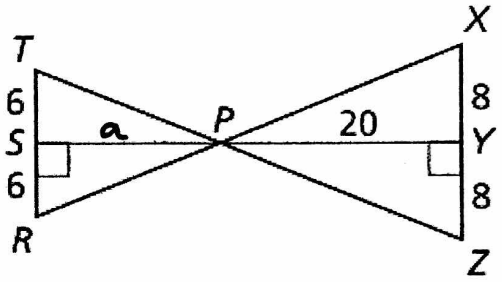
2. In the diagram, $\Delta DEF \sim \Delta MNP$. Find the value of x.



$\frac{x}{30} = \frac{15}{18} \frac{5}{6}$

$6x = 150 \rightarrow \boxed{x = 25}$

3. In the diagram, $\Delta TPR \sim \Delta XPZ$. Find the length of the altitude $\overline{PS}$.



$\frac{6}{a} = \frac{8}{20} \frac{2}{5}$

$2a = 30$

$\boxed{a = 15}$ ∴ $\boxed{PS = 15}$