

Warm Up:

1. You are making pancakes and the recipe calls for 2 cups of mix and 1.5 cups of water. If you want to use 3 cups of mix, how much water do you need?

2. Solve for x .
$$\frac{x+4}{x-53} = \frac{31}{12}$$

Learning Goal: Today I will learn about similar polygons.

Success Criteria: I am able to prove polygons similar using a similarity statement and/or extended proportion.

7.2 Similar Figures

*Similar Figures

ys

Figures that have the same **shape** but not necessarily the same **size**.



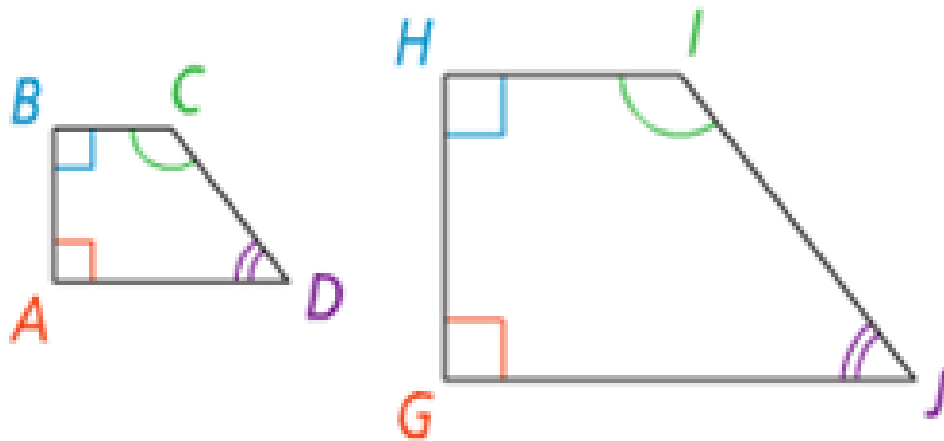
~ "similar to"

*Similar Polygons

ys

Two **polygons** where **corresponding** angles are congruent and whose lengths of corresponding sides are **proportional**.

$$ABCD \sim GHIJ$$



$$\angle A \cong \boxed{\text{dotted}}$$

$$\angle B \cong \boxed{\text{dotted}}$$

$$\angle C \cong \boxed{\text{dotted}}$$

$$\angle D \cong \boxed{\text{dotted}}$$

$$\frac{AB}{GH} = \frac{BC}{HI} = \frac{CD}{IJ} = \frac{AD}{GJ}$$

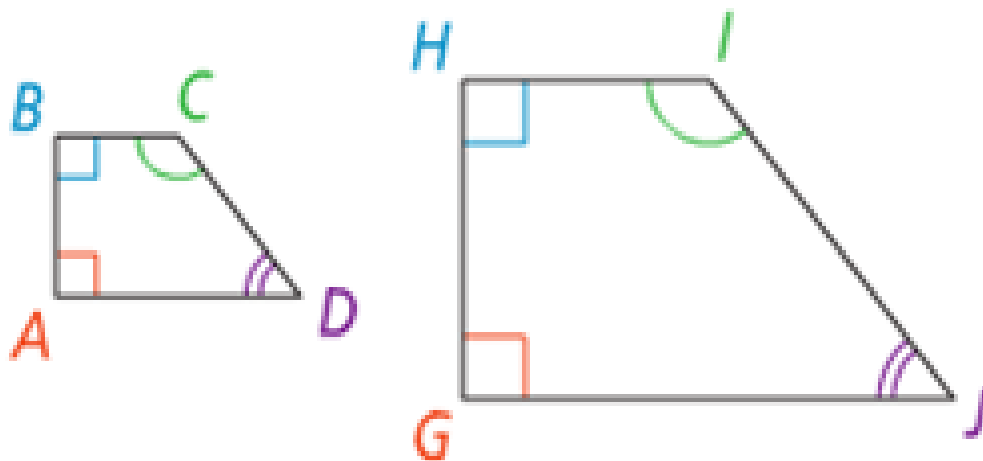
*Extended Proportion

ys

When 3 or more ratios are equal.

$$\frac{AB}{GH} = \frac{BC}{HI} = \frac{CD}{IJ} = \frac{AD}{GJ}$$

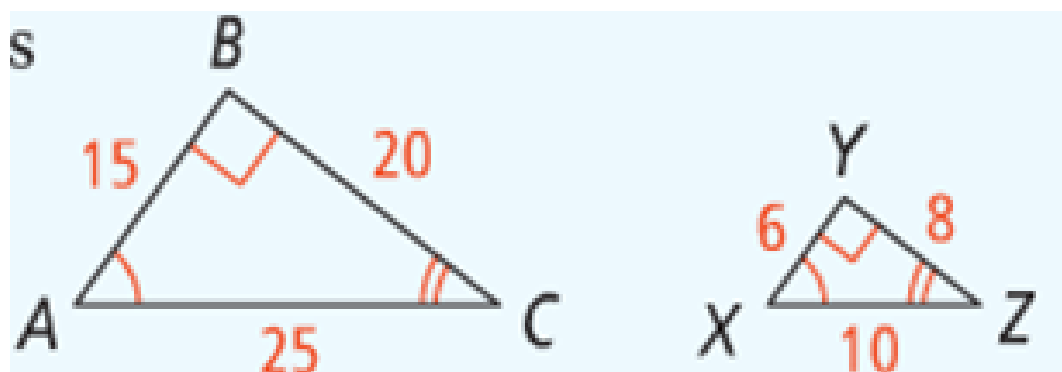
$$ABCD \sim GHIJ$$



*Scale Factor

ys

The **ratio** of corresponding linear **measurements** of 2 **similar** figures.



$$\frac{BC}{YZ} = \frac{20}{8} = \frac{5}{2}$$

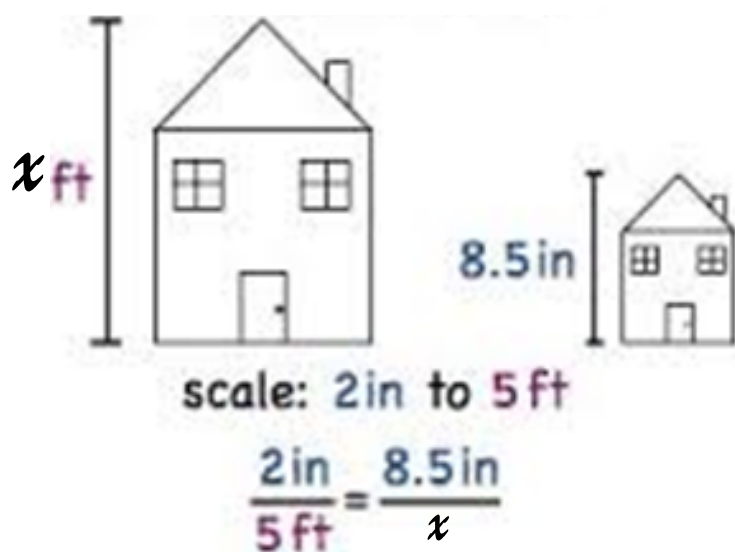
← Scale factor
Can also be 5:2

*Scale Drawing

ys

A drawing whose **lengths** are proportional to their corresponding **actual** lengths.

How tall is the actual house?



*Scale

ys

The **ratio** that compares each **length** in a scale drawing to the **actual** length.

$$1 \text{ cm} = 200 \text{ meters}$$

$$1 \text{ inch} = 100 \text{ miles}$$

scale : actual

**Problem 1** Understanding Similarity

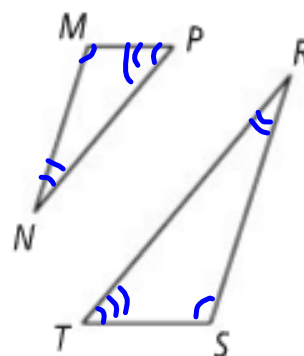
$$\triangle MNP \sim \triangle SRT$$

A What are the pairs of congruent angles?

$$\angle M \cong \angle S, \angle N \cong \angle R, \text{ and } \angle P \cong \angle T$$

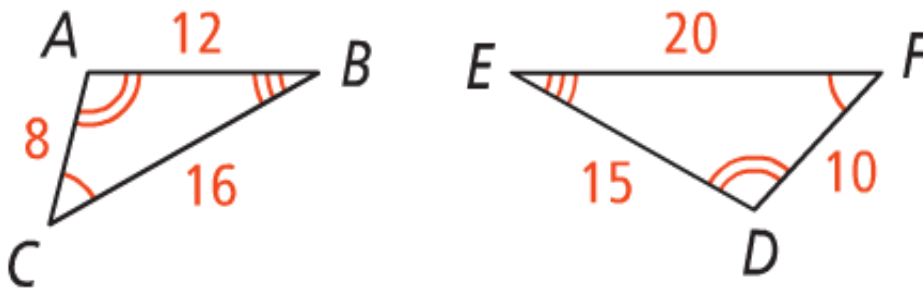
B What is the extended proportion for the ratios of corresponding sides?

$$\frac{MN}{SR} = \frac{NP}{RT} = \frac{MP}{ST}$$



Determining Similarity

Are the polygons similar? If so, write a similarity statement and give the scale factor.



Step 1: Identify pairs of congruent angles.

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

$$\begin{aligned} 4 &+ 0 & 5 \\ 4 &: & 5 \\ \frac{4}{5} \end{aligned}$$

Step 2: Compare the ratios of corresponding sides. (They must ALL be the same)

$$\frac{CA}{FD} = \frac{8}{10} = \frac{4}{5}$$

$$\frac{AB}{DE} = \frac{12}{15} = \frac{4}{5}$$

$$\frac{CB}{EF} = \frac{16}{20} = \frac{4}{5}$$

Are the polygons similar? If they are, write a similarity statement and give the scale factor.

A $JKLM$ and $TUVW$

Step 1 Identify pairs of congruent angles.

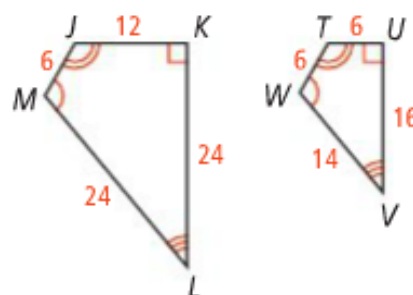
$$\angle J \cong \angle T, \angle K \cong \angle U, \angle L \cong \angle V, \text{ and } \angle M \cong \angle W$$

Step 2 Compare the ratios of corresponding sides.

$$\frac{JK}{TU} = \frac{12}{6} = \frac{2}{1} \quad \frac{KL}{UV} = \frac{24}{16} = \frac{3}{2}$$

$$\frac{LM}{VW} = \frac{24}{14} = \frac{12}{7} \quad \frac{JM}{TW} = \frac{6}{6} = \frac{1}{1}$$

Corresponding sides are not proportional, so the polygons are not similar.



Determining Side Length

$$ABCD \sim EFGD$$

What is the scale factor?

$$\frac{9}{6} = \frac{3}{2}$$

Solve for x.

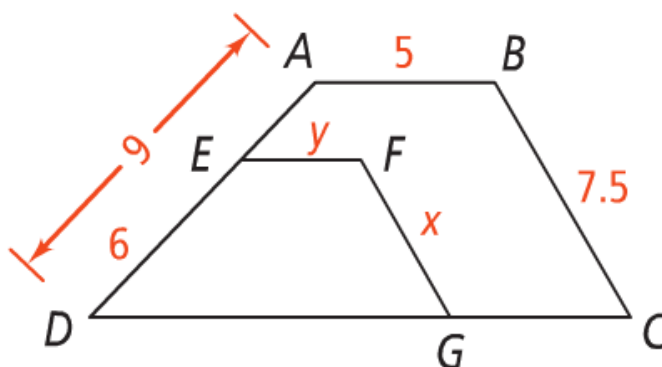
$$\frac{7.5}{x} = \frac{3}{2}$$

$$\frac{15}{3} = \frac{3x}{3} \quad x = 5$$

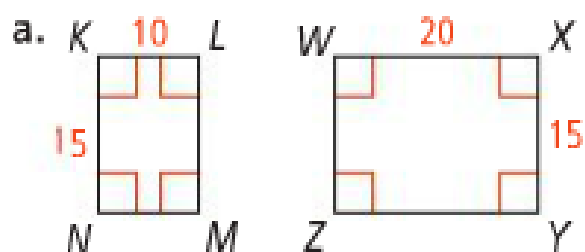
Solve for y.

$$\frac{5}{y} = \frac{3}{2}$$

$$\frac{10}{3} = \frac{3y}{3} \quad y = 3.3$$

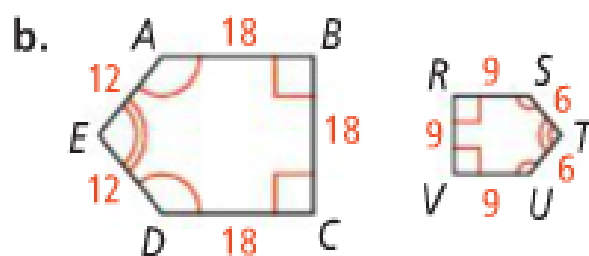


Are the polygons similar? If they are, write a similarity statement and give the scale factor.



$$\frac{10}{15} = \frac{2}{3} \quad \frac{15}{20} = \frac{3}{4}$$

Not similar



$$\frac{18}{9} = \frac{2}{1} \quad \frac{12}{6} = \frac{2}{1}$$

$ABCDE \sim SRVUT$

Closure: Today I learned about polygon similarity and similarity statements.

