

Key

RATIOS IN SIMILAR POLYGONS

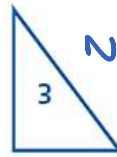
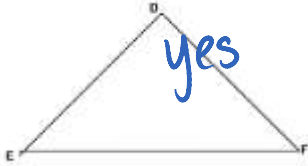
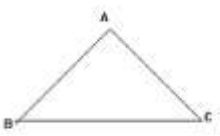


Target 7.1: Identify similar polygons and apply properties of similar polygons to solve problems.

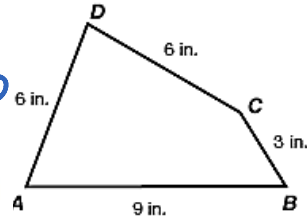
SIMILAR: Figures that have the same Shape but not necessarily the same Size.

SYMBOL FOR SIMILAR: \sim

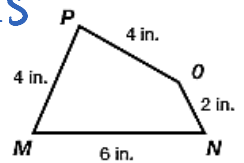
DO THESE FIGURES APPEAR SIMILAR?



NO

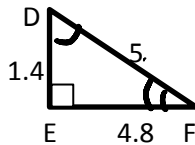
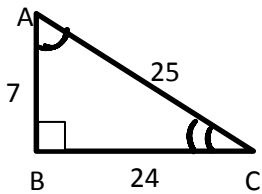


yes



SIMILAR POLYGONS: Two polygons are Similar if and only if their corresponding angles are congruent and their corresponding side lengths are proportional.

Blast from the Past If $\triangle ABC \sim \triangle DEF$ identify the pairs of corresponding angles and corresponding sides.



Corresponding Angles:

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

Corresponding Sides:

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

SIMILARITY RATIO: Ratio of the lengths of the corresponding sides of two similar polygons.

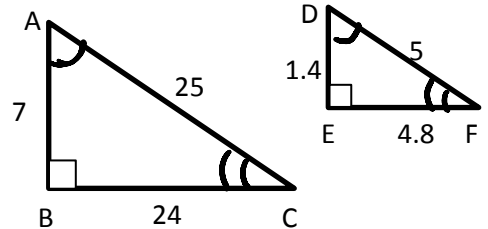
EXAMPLE 1: Given $\triangle ABC \sim \triangle DEF$

a) Find the similarity ratio of $\triangle ABC$ to $\triangle DEF$.

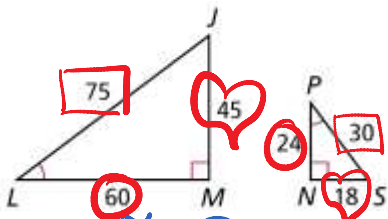
$$\frac{25}{5} = \boxed{\frac{5}{1}}$$

b) Find the similarity ratio of $\triangle DEF$ to $\triangle ABC$.

$$\frac{5}{25} = \boxed{\frac{1}{5}}$$



EXAMPLE 2: Determine whether the polygons are similar. If so, write the similarity ratio and a similarity statement.



$$\sim \text{ratio: } \frac{5}{2}$$

$$\begin{aligned}\angle L &\cong \angle P \\ \angle M &\cong \angle N \\ \angle J &\cong \angle S\end{aligned}$$

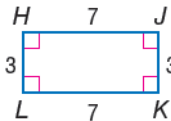
$$\frac{LM}{PN} = \frac{LJ}{PS} = \frac{MJ}{NS}$$

$$\frac{60}{24} = \frac{75}{30} = \frac{45}{18}$$

$$\frac{5}{2} = \frac{5}{2} = \frac{5}{2} \checkmark$$

statement:

$$\triangle LMJ \sim \triangle PNS$$



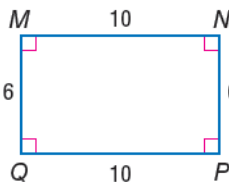
$$\angle H \cong \angle M$$

$$\angle J \cong \angle N$$

$$\angle L \cong \angle Q$$

$$\angle K \cong \angle P$$

$$\frac{6}{3} = 2 \quad \frac{10}{7} = .7$$



Not similar

PARTNER PRACTICE

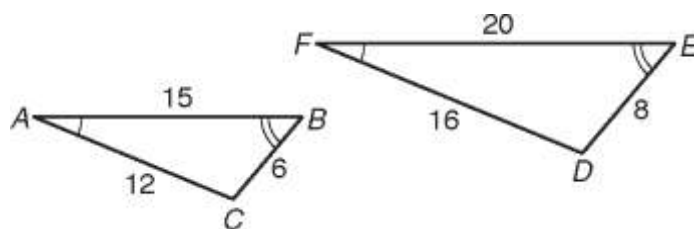
Directions: For #1-3, use the similar triangles below.

1. Name the pairs of congruent angles.

$$\angle A = \underline{\angle F}$$

$$\angle B = \underline{\angle E}$$

$$\angle C = \underline{\angle D}$$



2. Write the corresponding side lengths in the proportion below.

$$\frac{AB}{FE} = \frac{CB}{DE} = \frac{AC}{FD}$$

3. Write the similarity ratio and a similarity statement about the triangles.

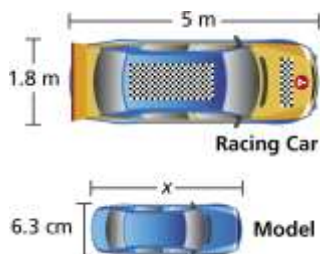
$$\frac{15}{20} = \frac{3}{4}$$

$$\frac{12}{16} = \frac{3}{4}$$

$$\frac{6}{8} = \frac{3}{4}$$

$\Delta ABC \sim \Delta FED$

4. Find the length of the model to the nearest tenth of a centimeter.



$$\frac{1.8}{6.3} = \frac{5}{x}$$

$$1.8x = 31.5$$

$$x = 17.5 \text{ cm}$$

5. The similarity ratio of the height of the tree to the building is 2:7. The height of the tree is 32 feet.

Find the height of the building.

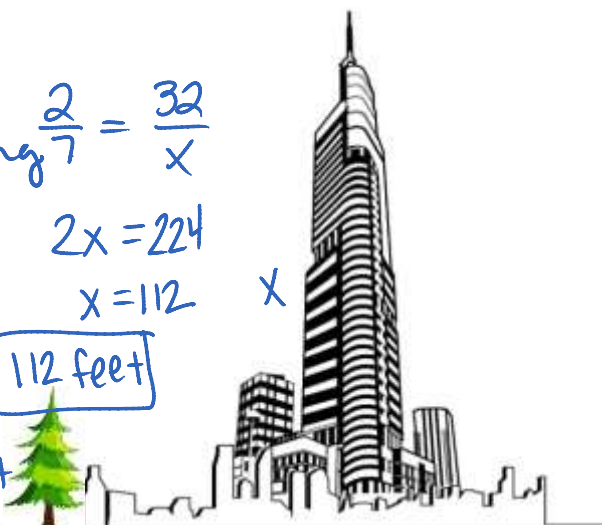
$$\frac{\text{tree}}{\text{building}} = \frac{2}{7} = \frac{32}{x}$$

$$2x = 224$$

$$x = 112$$

112 feet

32 ft



6. Determine if the iPhone 6+ and iPad are similar figures.



Not similar

$$\frac{3.06}{6.6} = 0.46$$

$$\frac{6.22}{9.5} = 0.65$$

$$\left. \begin{array}{l} 0.46 \\ 0.65 \end{array} \right\} \neq$$