

7-2 Similar Polygons

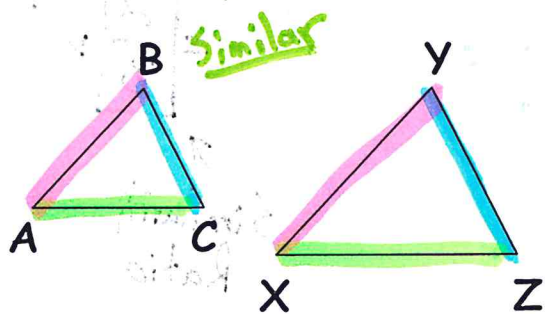
Similar Figures:

- ① Corresponding Angles are $\cong$.
- ② Corresponding sides are proportional.

Similarity Ratio: The ratio of the lengths of corresponding sides.

Example 1 - Understanding Similarity

$$\triangle ABC \sim \triangle XYZ$$



Complete each statement:

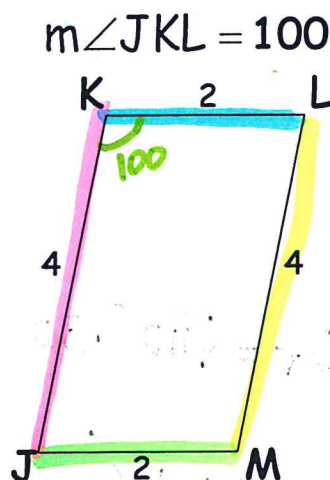
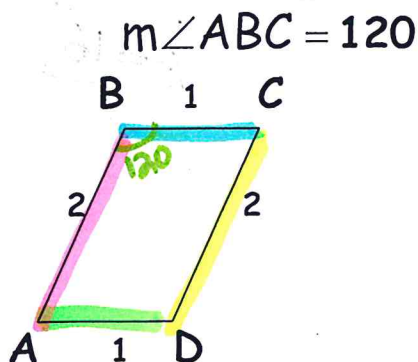
- ① a) $m\angle B = m\angle Y$
 $m\angle C = m\angle Z$
 $m\angle A = m\angle X$

- ② b) $\frac{BC}{YZ} = \frac{AC}{XZ} = \frac{AB}{XY}$

*Statement of Proportionality

Example 2 - Determining Similarity

Determine whether the parallelograms are similar. Explain.



- ① Corresp. $\angle$'s $\cong$? X
 $m\angle B \neq m\angle K$

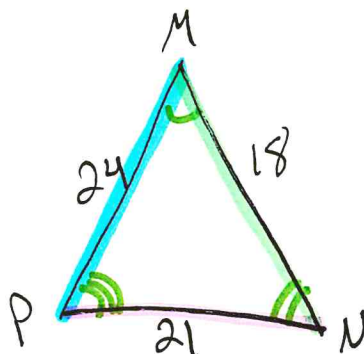
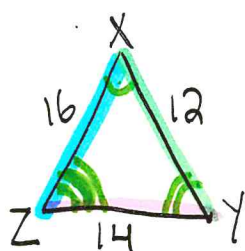
Therefore, NOT similar

- ② Corresp. Sides Proportional? ✓

$$\frac{BC}{KL} = \frac{AB}{JK} = \frac{AD}{JM} = \frac{DC}{ML}$$

$$\frac{1}{2} = \frac{2}{4} = \frac{1}{2} = \frac{2}{4} = \frac{1}{2} \checkmark$$

✓ Quick Check Sketch $\triangle XYZ$ and $\triangle MNP$ with $\angle X \cong \angle M$, $\angle Y \cong \angle N$ and $\angle Z \cong \angle P$. Also, $XY = 12$, $YZ = 14$, $ZX = 16$, $MN = 18$, $NP = 21$, and $PM = 24$. Can you conclude that the two triangles are similar? Explain.



① Corresp. $\angle$'s $\cong$? ✓

② Corresp. Sides Proportional? ✓

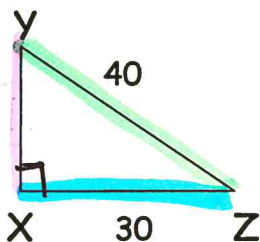
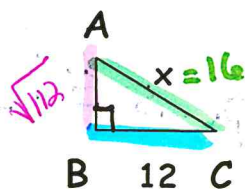
$$\frac{16}{24} = \frac{12}{18} = \frac{14}{21} = \frac{2}{3} \checkmark$$

Yes, they are similar.

↑
Similarity Ratio

You can use proportions to find unknown lengths in similar polygons.

Example 3 - Using Similar Figures - If $\triangle ABC \sim \triangle YXZ$, find x .



~~$$\frac{12}{30} = \frac{x}{40}$$~~

$$\begin{array}{r} 30x = 480 \\ \hline 30 \quad 30 \\ \hline x = 16 \end{array}$$

✓ Quick Check - Find AB . Then use a proportion to find YX .

~~$$\frac{12}{30} = \frac{\sqrt{112}}{r}$$~~

$$\frac{12r}{12} = \frac{\sqrt{112} \cdot 30}{12}$$

$$r = 26.46$$