Date _____

Dear Family,

In this chapter, your child will learn about **similarity.** Figures that are similar have the same shape but not necessarily the same size. Your child will begin the lesson with a discussion about ratios and proportions.

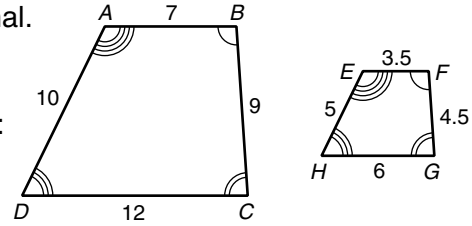
A **ratio** compares two numbers by division. Ratios can be written as a to b, $a : b$, or $\frac{a}{b}$.

A **proportion** is an equation that states that two ratios are equal. The truth of a proportion can be tested by the cross products property, which states: If $\frac{a}{b} = \frac{c}{d}$, then $ad = bc$.

Your child will also compare polygons. Two conditions must be met for two polygons to be similar.

1. The corresponding angles must be congruent.
2. The corresponding sides must be proportional.

Consider the polygons shown here.

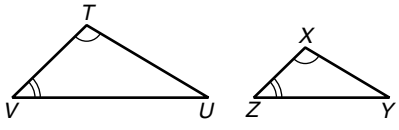
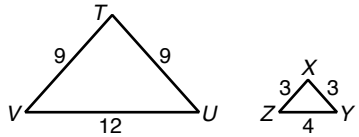
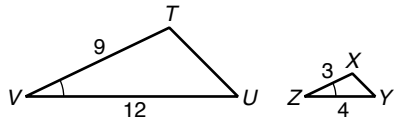


The following are true about these two polygons:

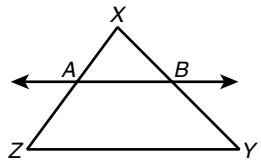
$\angle A \cong \angle E$
$\angle B \cong \angle F$
$\angle C \cong \angle G$
$\angle D \cong \angle H$
$\frac{AB}{EF} = \frac{BC}{FG} = \frac{CD}{GH} = \frac{DA}{HE} = \frac{2}{1}$

Therefore, these two figures are similar.

Your child will also learn a postulate and two theorems that can be used to decide whether triangles are similar. These are stated in the table below.

Postulate or Theorem	Example	Conclusion
Angle-Angle Similarity If two angles of one triangle are congruent to two angles of another triangle, then the triangles are similar.	 $\angle T \cong \angle X, \angle V \cong \angle Z$	$\triangle TUV \sim \triangle XYZ$
Side-Side-Side Similarity If the three sides of one triangle are proportional to the three corresponding sides of another triangle, then the triangles are similar.	 $\frac{TU}{XY} = \frac{UV}{YZ} = \frac{VT}{ZX} = \frac{3}{1}$	$\triangle TUV \sim \triangle XYZ$
Side-Angle-Side If two sides of one triangle are proportional to two sides of another triangle and their included angles are congruent, then the triangles are similar.	 $\angle V \cong \angle Z, \frac{VT}{ZX} = \frac{VU}{ZY} = \frac{3}{1}$	$\triangle TUV \sim \triangle XYZ$

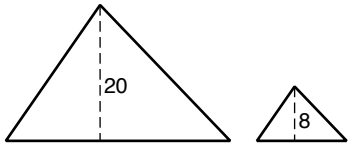
Your child will learn some of the more practical uses of the properties of similar triangles and other proportional relationships. For example, artists use the properties of similar triangles in perspective drawings. They may use the Triangle Proportionality Theorem in their work.



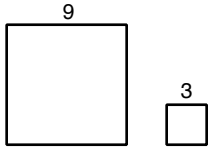
Artists know that to create perspective drawings, certain relationships must be maintained. In this figure, $\overline{AB} \parallel \overline{ZY}$, so $\frac{XA}{AZ} = \frac{XB}{BY}$. This is true when a line is parallel to a side of a triangle.

The use of a **scale** in drawings also reflects proportional relationships. The scale of a drawing is the ratio of any length in a drawing to the corresponding actual length. The following figures are proportional, and your child will learn to determine the scale that can be used to compare them.

Scale is written as a ratio, so the scale for these two triangles is 5 : 2.

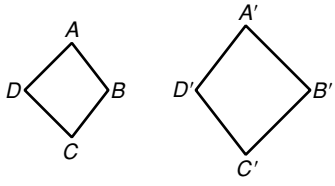


The scale for these two squares is 3 : 1.

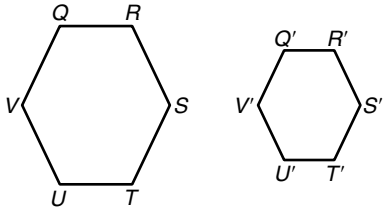


Your child will also learn that figures can be enlarged or reduced through transformations called dilations.

The polygon on the right is an enlarged version of the polygon on the left.



The polygon on the right is a reduced version of the polygon on the left.



For additional resources, visit *go.hrw.com* and enter the keyword MG7 Parent.