- 2 figures with the same shape, but different sizes

- Corresponding angles
  - 2 angles that occupy the same relative position on similar figures
  - Congruent angles means the same or equal shape and size

- Corresponding sides
  - 2 sides that occupy the same relative position in similar figures.

Determining sides in similar figures

- When working with length of sides in similar figures, the ratio of the corresponding sides is always the same.
  - Because the figures are always a reduction or enlargement of each other

Ex. 1 These 2 figures are similar. Find the lengths of the sides of the smaller figure.

Big figure

\[ \frac{BC}{GH} = \frac{AB}{FG} \Rightarrow \frac{10}{5} = \frac{12}{FG} \]

Smaller figure

\[ \times 5 \times 5 \]

\[ \text{STEP 1: Set up proportion} \]

\[ \text{STEP 2: Cross multiply} \]
\[ \overline{FG} \] \[ \overline{GH} \] \[ \overline{FG} \]

\[
\frac{\overline{FG} \cdot 18}{\overline{FG}} = \frac{12 \times 5}{10}
\]

\[
\frac{18}{10} = \frac{60}{FG}
\]

\[
\overline{FG} = 6''
\]

**Step 2:** Cross multiply \[ \frac{3}{2} \]

**Step 3:** Solve for the side

Another solution...

\[ 10'' \text{ vs. } 5'' \]

\[
\frac{10}{5} = 2'' \text{ difference between the 2 figures}
\]

\[
\text{so divide all the sides by } 2''
\]

**SIDE**

\[ \overline{HI} = 7'' \]

\[ \overline{IJ} = 4'' \]

\[ \overline{JF} = 3'' \]

**Determining ANGLES in Similar Figures**

\[ \triangle RST \text{ is similar to } \triangle LNM \]

\[ \angle L = \angle R = 85^\circ \]

*look for correct alphabetical order to see which angles correspond*
\[ \angle M = \angle S = 78^\circ \] + re-arrange it if necessary

\[ \angle N = \angle T = 17^\circ \]

2 Figures are similar if all sides are = and all angles are =

Ex. #1 The quadrilaterals ABCD and WXYZ are similar. State the corresponding sides and angles

look for the alphabetical order of sides and angles

\[ \angle A = \angle W \]
\[ \angle B = \angle X \]
\[ \angle C = \angle Y \]
\[ \angle D = \angle Z \]

sides are equal

- The 2 quads are similar because ABCD is similar to WXYZ
- Use the symbol "\(~\)" which means "similar to"

ABCD \(~\) WXYZ