

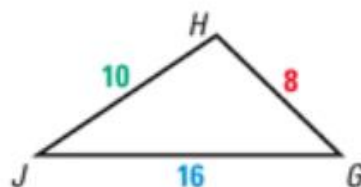
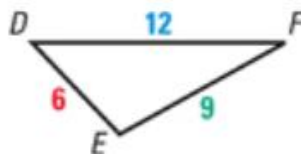
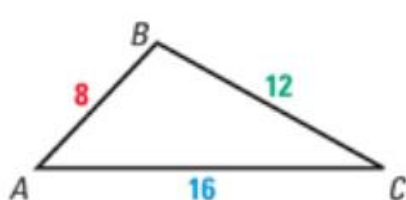
THEOREM 6.2 Side-Side-Side (SSS) Similarity Theorem

If the corresponding side lengths of two triangles are proportional, then the triangles are similar.



If $\frac{AB}{RS} = \frac{BC}{ST} = \frac{CA}{TR}$, then $\triangle ABC \sim \triangle RST$.

Is either $\triangle DEF$ or $\triangle GHJ$ similar to $\triangle ABC$?



Solution

Compare $\triangle ABC$ and $\triangle DEF$ by finding ratios of corresponding side lengths.

Shortest sides

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

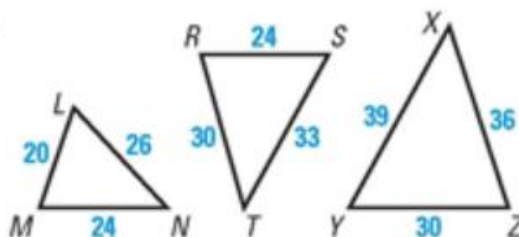
Longest sides

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

Remaining sides

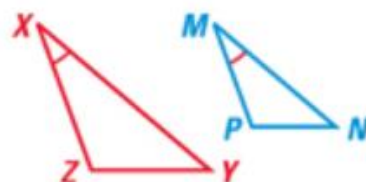
$$\frac{BC}{EF} = \frac{12}{9} = \frac{4}{3}$$

- Which of the three triangles are similar? Write a similarity statement.
- The shortest side of a triangle similar to $\triangle RST$ is 12 units long. Find the other side lengths of the triangle.



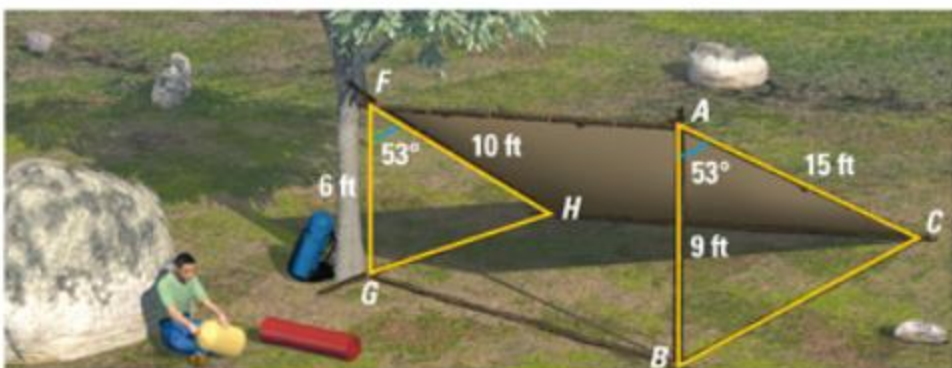
THEOREM 6.3 Side-Angle-Side (SAS) Similarity Theorem

If an angle of one triangle is congruent to an angle of a second triangle and the lengths of the sides including these angles are proportional, then the triangles are similar.



If $\angle X \cong \angle M$ and $\frac{ZX}{PM} = \frac{XY}{MN}$, then $\triangle XYZ \sim \triangle MNP$.

LEAN-TO SHELTER You are building a lean-to shelter starting from a tree branch, as shown. Can you construct the right end so it is similar to the left end using the angle measure and lengths shown?



Solution

Both $m\angle A$ and $m\angle F$ equal 53° , so $\angle A \cong \angle F$. Next, compare the ratios of the lengths of the sides that include $\angle A$ and $\angle F$.

Shorter sides $\frac{AB}{FG} = \frac{9}{6} = \frac{3}{2}$

Longer sides $\frac{AC}{FH} = \frac{15}{10} = \frac{3}{2}$