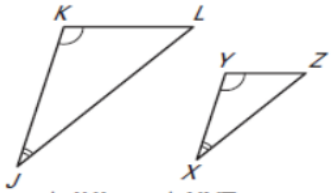
6.4 Prove Triangles Similar by AA

Goal • Use the AA Similarity Postulate.

POSTULATE 22: ANGLE-ANGLE (AA) SIMILARITY POSTULATE

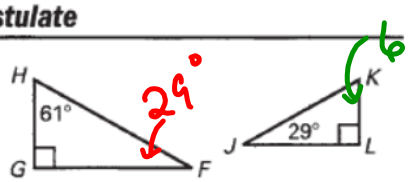
If two angles of one triangle are congruent to two angles of another triangle, then the two triangles are similar.



$\triangle JKL \sim \triangle XYZ$

Example 1 *Use the AA Similarity Postulate*

Determine whether the triangles are similar. If they are similar, write a similarity statement. Explain.



$\angle F = 180° - 61° - 90° = 29°$

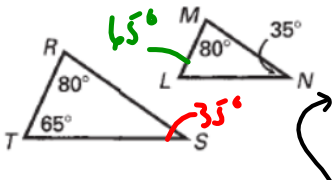
$\angle K = 180° - 29° - 90° = 61°$

SINCE $\angle H \cong \angle K$, $\angle G \cong \angle L$, $\angle F \cong \angle J$;

$\triangle HGF \sim \triangle KLJ$

Checkpoint Determine whether the triangles are similar. If they are similar, write a similarity statement.

1.

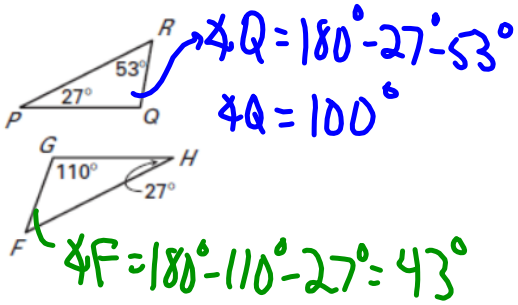


SO: $\triangle RTS \sim \triangle MLN$

$\angle S = 180° - 65° - 80° = 35°$

$\angle N = 180° - 80° - 35° = 65°$

2.



$\angle Q = 180° - 27° - 53°$

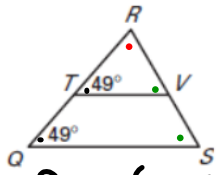
$\angle Q = 100°$

$\angle F = 180° - 110° - 27° = 43°$

$\triangle$S ARE NOT SIMILAR! ONLY ONE PAIR OF $\angle$S $\cong$

Show that the two triangles are similar.

a. $\triangle RTV$ and $\triangle RQS$

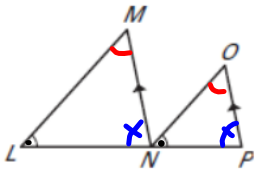


$\angle Q \cong \angle RTV$ (GIVEN)

$\angle TRV \cong \angle QRS$ (SAME $\angle$)

$\angle RVT \cong \angle RSQ$ (AA POSTULATE)

b. $\triangle LMN$ and $\triangle NOP$



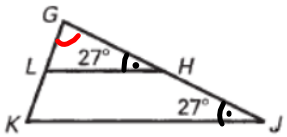
$\angle MLN \cong \angle ONP$ (GIVEN)

$\angle LMN \cong \angle NOP$ (ALTERNATE INT $\angle$S)

$\angle LNM \cong \angle NPO$ (AA POSTULATE)

Checkpoint **Determine whether the triangles are similar. If they are similar, write a similarity statement.**

2.



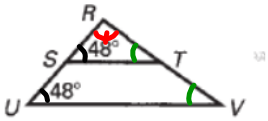
$\angle GHL \cong \angle GJK$ (GIVEN)

$\angle LGH \cong \angle KGJ$ (SAME $\angle$)

$\angle GLH \cong \angle GKJ$ (AA POSTULATE)

SO: $\triangle GLH \sim \triangle GKJ$

3.



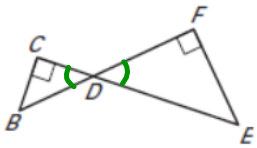
$\angle RST \cong \angle RUV$ (GIVEN)

$\angle SRT \cong \angle URT$ (SAME $\angle$)

$\angle RTS \cong \angle RVU$ (AA POST.)

SO: $\triangle RTS \sim \triangle RVU$

4. Show that $\triangle BCD \sim \triangle EFD$.



$\angle BCD \cong \angle EFD$ (BOTH 90°)

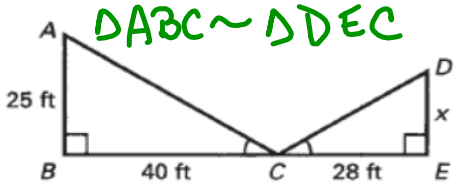
$\angle CDB \cong \angle FDE$ (VERTICAL $\angle$S)

$\angle B \cong \angle E$ (A.A. POSTULATE)

SO: $\triangle BCD \sim \triangle EFD$

Example 3 *Use Similar Triangles*

Find the value of x.



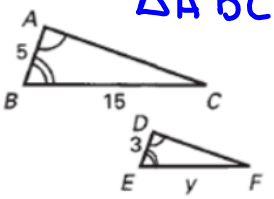
$\triangle ABC \sim \triangle DEC$

$\frac{25}{40} = \frac{x}{28} \Rightarrow \frac{5}{8} = \frac{x}{28}$

$5x = 224$

$x = 44.8$

Find the value of y.



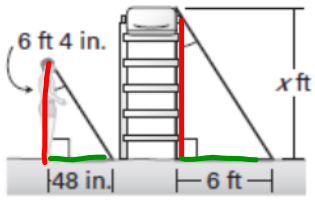
$\triangle ABC \sim \triangle DEF$

$\frac{5}{3} = \frac{15}{y} \rightarrow 5y = 45$

$y = 9$

Example 3 *Using similar triangles*

Height A lifeguard is standing beside the lifeguard chair on a beach. The lifeguard is 6 feet 4 inches tall and casts a shadow that is 48 inches long. The chair casts a shadow that is 6 feet long. How tall is the chair?



$\frac{6\text{ft }4\text{in}}{x} = \frac{48\text{in}}{6\text{ft}}$

$\frac{76\text{in}}{x} = \frac{48\text{in}}{72\text{in}}$

$\frac{76}{x} = \frac{48}{72}$ (÷2, ÷3)

$2x = 228$

$x = 114\text{in} = 9\text{ft }6\text{in}$

n Example 3, how long is the shadow of a person hat is 4 feet 9 inches tall?

$\frac{4\text{ft }9\text{in}}{x} = \frac{9\text{ft }6\text{in}}{6\text{ft}} \rightarrow \frac{57\text{in}}{x} = \frac{114\text{in}}{72\text{in}} \rightarrow \frac{57}{x} = \frac{19}{12} \rightarrow 19x = 684$

$x = 36''$

Shadow is 3ft long