What You Will Learn

SAS

- Use the Side-Side-Side (SSS) Congruence Theorem.
- Use the Hypotenuse-Leg (HL) Congruence Theorem.

Theorem 5.8 Side-Side-Side (SSS) Congruence Theorem

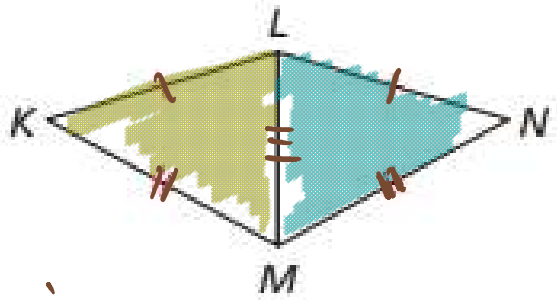
If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are congruent.

If $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and $\overline{AC} \cong \overline{DF}$, then $\triangle ABC \cong \triangle DEF$.

Write a proof.

Given $\overline{KL} \cong \overline{NL}$, $\overline{KM} \cong \overline{NM}$

Prove $\triangle KLM \cong \triangle NLM$



$\overline{KL} \cong \overline{NL}$ given

$\overline{KM} \cong \overline{NM}$ given

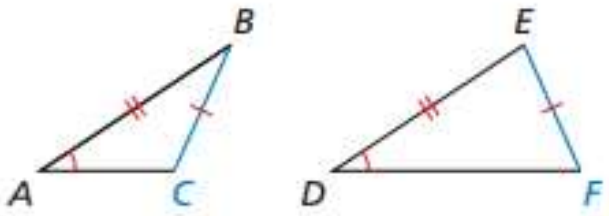
$\overline{LM} \cong \overline{LM}$ Reflexive PoC

$\triangle KLM \cong \triangle NLM$ SSS

Using the Hypotenuse-Leg Congruence Theorem

You know that SAS and SSS are valid methods for proving that triangles are congruent. What about SSA?

In general, SSA is *not* a valid method for proving that triangles are congruent. In the triangles below, two pairs of sides and a pair of angles not included between them are congruent, but the triangles are not congruent.

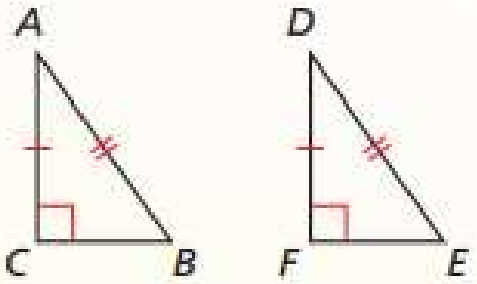


Theorem 5.9 Hypotenuse-Leg (HL) Congruence Theorem

If the hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of a second right triangle, then the two triangles are congruent.

If $\overline{AB} \cong \overline{DE}$, $\overline{AC} \cong \overline{DF}$, and $m\angle C = m\angle F = 90°$, then $\triangle ABC \cong \triangle DEF$.

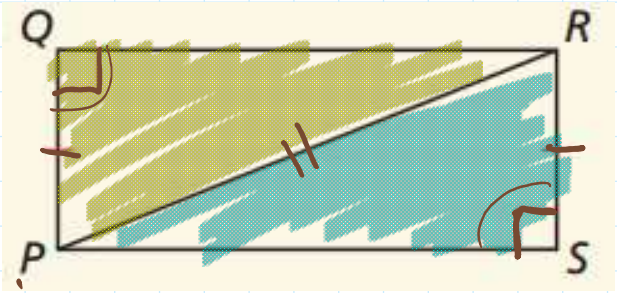
Proof Ex. 38, p. 470; *BigIdeasMath.com*



Write a proof.

Given $\overline{PQ} \cong \overline{RS}$, $\angle Q$ and $\angle S$ are right angles.

Prove $\triangle PQR \cong \triangle RSP$

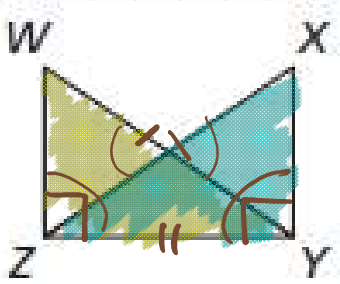


$\overline{PQ} \cong \overline{RS}$	given
$\angle Q$ and $\angle S$ are Right $\angle$s	given
$\angle Q \cong \angle S$	Def. of Right $\angle$s
$\overline{PR} \cong \overline{PR}$	Reflective P. of $\cong$
$\triangle PQR \cong \triangle RSP$	~~SSA~~ HL

Write a proof.

Given $\overline{WY} \cong \overline{XZ}, \overline{WZ} \perp \overline{ZY}, \overline{XY} \perp \overline{ZY}$

Prove $\triangle WYZ \cong \triangle XZY$



$\overline{WY} \cong \overline{XZ}$	Given
$\overline{WZ} \perp \overline{ZY}$	Given
$\angle WZY$ is a Right $\angle$	Def. of $\perp$
$\therefore \angle WZY = 90°$	Def. of Right $\angle$s
$\overline{XY} \perp \overline{ZY}$	Given
$\angle XYZ$ is a Right $\angle$	Def of $\perp$
$\therefore \angle XYZ = 90°$	Def. of Right $\angle$s
$\angle XYZ \cong \angle WZY$	Def. of $\cong$
$\overline{ZY} \cong \overline{ZY}$	Reflexive PoC
$\triangle WYZ \cong \triangle XZY$	~~SSA~~ HL

Unnecessary lines, but I might not have known when this proof was going.

Practice sec 5.5 pg. 266: 1, 3-10A, 15, 19