

4-4 Study Guide and Intervention

Proving Congruence—SSS, SAS

SSS Postulate You know that two triangles are congruent if corresponding sides are congruent and corresponding angles are congruent. The Side-Side-Side (SSS) Postulate lets you show that two triangles are congruent if you know only that the sides of one triangle are congruent to the sides of the second triangle.

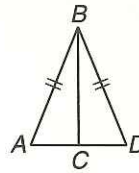
SSS Postulate	If the sides of one triangle are congruent to the sides of a second triangle, then the triangles are congruent.
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Example

Write a two-column proof.

Given: $\overline{AB} \cong \overline{DB}$ and C is the midpoint of \overline{AD} .

Prove: $\triangle ABC \cong \triangle DBC$

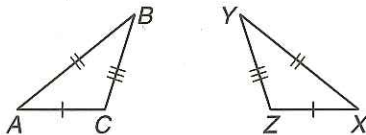


Statements	Reasons
1. $\overline{AB} \cong \overline{DB}$	1. Given
2. C is the midpoint of \overline{AD} .	2. Given
3. $\overline{AC} \cong \overline{DC}$	3. Definition of midpoint
4. $\overline{BC} \cong \overline{BC}$	4. Reflexive Property of \cong
5. $\triangle ABC \cong \triangle DBC$	5. SSS Postulate

Exercises

Write a two-column proof.

1.

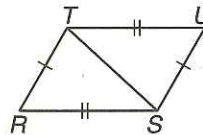


Given: $\overline{AB} \cong \overline{XY}$, $\overline{AC} \cong \overline{XZ}$, $\overline{BC} \cong \overline{YZ}$

Prove: $\triangle ABC \cong \triangle XYZ$

Statements	Reasons

2.



Given: $\overline{RS} \cong \overline{UT}$, $\overline{RT} \cong \overline{US}$

Prove: $\triangle RST \cong \triangle UTS$

Statements	Reasons

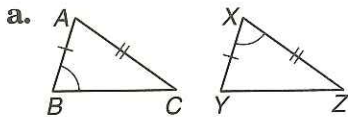
4-4 Study Guide and Intervention *(continued)*

Proving Congruence—SSS, SAS

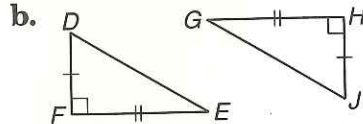
SAS Postulate Another way to show that two triangles are congruent is to use the Side-Angle-Side (SAS) Postulate.

SAS Postulate	If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.
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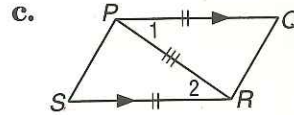
Example For each diagram, determine which pairs of triangles can be proved congruent by the SAS Postulate.



In $\triangle ABC$, the angle is not “included” by the sides AB and AC . So the triangles cannot be proved congruent by the SAS Postulate.



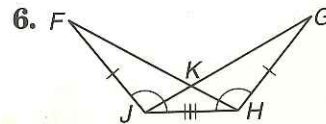
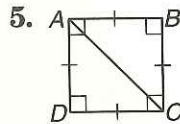
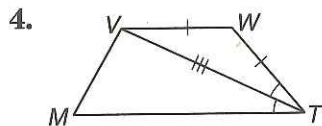
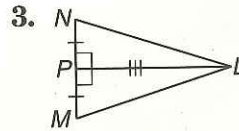
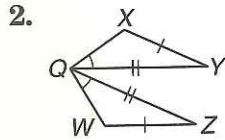
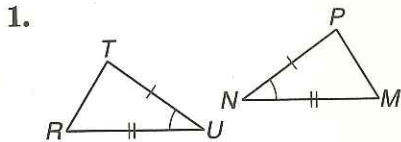
The right angles are congruent and they are the included angles for the congruent sides. $\triangle DEF \cong \triangle JGH$ by the SAS Postulate.



The included angles, $\angle 1$ and $\angle 2$, are congruent because they are alternate interior angles for two parallel lines. $\triangle PSR \cong \triangle RQP$ by the SAS Postulate.

Exercises

For each figure, determine which pairs of triangles can be proved congruent by the SAS Postulate.



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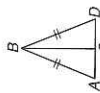
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SAS Postulate If the sides of one triangle are congruent to the sides of a second triangle, then the triangles are congruent.

Example Write a two-column proof.
 Given: $AB \cong DB$ and C is the midpoint of AD .
 Prove: $\triangle ABC \cong \triangle DBC$



Statements	Reasons
1. $\overline{AB} \cong \overline{DB}$	1. Given
2. C is the midpoint of \overline{AD} .	2. Given
3. $\overline{AC} \cong \overline{DC}$	3. Definition of midpoint
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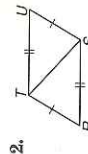
Exercises

Write a two-column proof.



Given: $\overline{AB} \cong \overline{AC}$, $\overline{AX} \cong \overline{AY}$, $\overline{BC} \cong \overline{YZ}$
 Prove: $\triangle ABC \cong \triangle XYZ$

Statements	Reasons
1. $\overline{AB} \cong \overline{XY}$ $\overline{AC} \cong \overline{XZ}$ $\overline{BC} \cong \overline{YZ}$	1. Given
2. $\triangle ABC \cong \triangle XYZ$	2. SSS Post.



Given: $\overline{RS} \cong \overline{RT}$, $\overline{RT} \cong \overline{US}$
 Prove: $\triangle RST \cong \triangle UTS$

Statements	Reasons
1. $\overline{RS} \cong \overline{UT}$ $\overline{RT} \cong \overline{US}$	1. Given
2. $\overline{ST} \cong \overline{TS}$	2. Refl. Prop.
3. $\triangle RST \cong \triangle UTS$	3. SSS Post.

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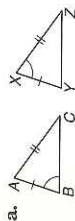
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Proving Congruence—SSS, SAS

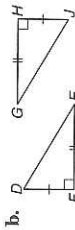
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SAS Postulate If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the triangles are congruent.

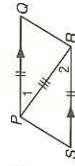
Example For each diagram, determine which pairs of triangles can be proved congruent by the SAS Postulate.



a. In $\triangle ABC$, the angle is not "included" by the sides \overline{AB} and \overline{AC} . So the triangles cannot be proved congruent by the SAS Postulate.



b. The right angles are congruent and they are the included angles for the congruent sides. $\triangle DEF \cong \triangle GHE$ by the SAS Postulate.



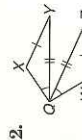
c. The included angles, $\angle 1$ and $\angle 2$, are congruent because they are alternate interior angles for two parallel lines. $\triangle PSR \cong \triangle RQP$ by the SAS Postulate.

Exercises

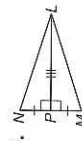
For each figure, determine which pairs of triangles can be proved congruent by the SAS Postulate.



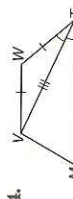
1. $\triangle TRU \cong \triangle PMN$ by the SAS Postulate.



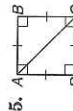
2. $\angle XQY$ and $\angle WQZ$ are not the included angles for the congruent segments. The triangles are not congruent by the SAS Postulate.



3. $\angle MPL \cong \angle NPL$ because both are right angles. $\triangle MPL \cong \triangle NPL$ by the SAS Postulate.



4. The triangles cannot be proved congruent by the SAS Postulate.



5. $\angle D \cong \angle B$ because both are right angles. The two triangles are congruent by the SAS Postulate.



6. The congruent angles are the included angles for the congruent sides. $\triangle FJH \cong \triangle GHJ$ by the SAS Postulate.