POSTULATE 21 Angle-Side-Angle (ASA) Congruence Postulate

If two angles and the included side of one triangle are congruent to two angles and the included side of a second triangle, then the two triangles are congruent.
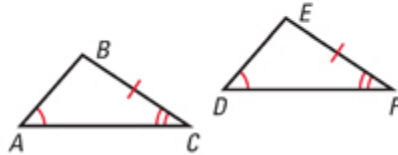
If   **Angle** $\angle A \cong \angle D$,

       Side $\overline{AC} \cong \overline{DF}$, and

       Angle $\angle C \cong \angle F$,

then $\triangle ABC \cong \triangle DEF$.
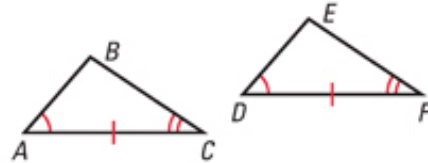
THEOREM 4.6 Angle-Angle-Side (AAS) Congruence Theorem

If two angles and a non-included side of one triangle are congruent to two angles and the corresponding non-included side of a second triangle, then the two triangles are congruent.

If   **Angle** $\angle A \cong \angle D$,

       Angle $\angle C \cong \angle F$, and

       Side $\overline{BC} \cong \overline{EF}$,

then $\triangle ABC \cong \triangle DEF$.

EXAMPLE 1   **Identify congruent triangles**

Can the triangles be proven congruent with the information given in the diagram? If so, state the postulate or theorem you would use.
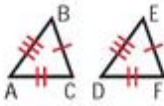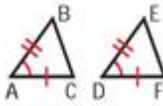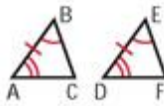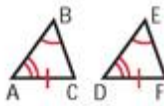
a.   b.   c.

Solution

a. The vertical angles are congruent, so two pairs of angles and a pair of non-included sides are congruent. The triangles are congruent by the AAS Congruence Theorem.

b. There is not enough information to prove the triangles are congruent, because no sides are known to be congruent.

c. Two pairs of angles and their included sides are congruent. The triangles are congruent by the ASA Congruence Postulate.

Triangle Congruence Postulates and Theorems

You have learned five methods for proving that triangles are congruent.

SSS	SAS	HL (right △ only)	ASA	AAS
All three sides are congruent.	Two sides and the included angle are congruent.	The hypotenuse and one of the legs are congruent.	Two angles and the included side are congruent.	Two angles and a (non-included) side are congruent.

In the Exercises, you will prove three additional theorems about the congruence of right triangles: **A**ngle-**L**eg, **L**eg-**L**eg, and **H**ypotenuse-**A**ngle.