Name: Date: Period: 4

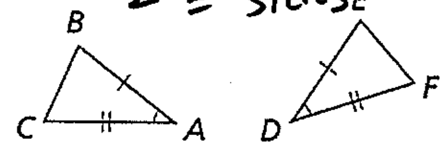
Side-Angle-Side Triangle Congruence

Lesson Objective IWBAT prove 2 Δs are ≅ by SAS ≅

Side-Angle-Side Congruence Theorem (SAS ≅ **)**

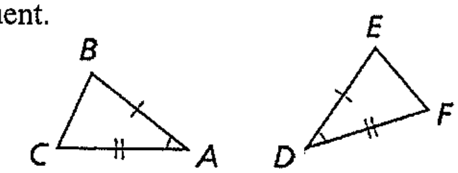
If two pairs of corresponding sides are congruent and the included angles are congruent, then the triangles are congruent.

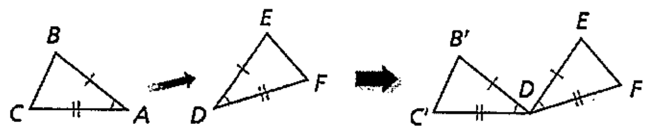
∠ formed by 2 ≅ sides

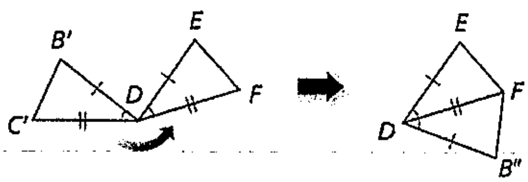


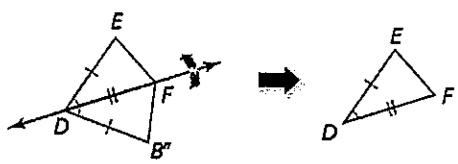
PROOF: Use transformations to prove why the two triangles are congruent.

Given: $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, $\overline{AC} \cong \overline{DF}$
Prove: $\Delta ABC \cong \Delta DEF$



1.  translate

2.  rotate

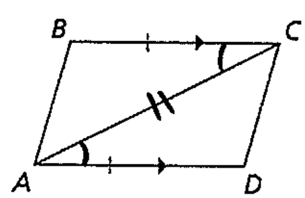
3.  reflect

4. ≅! ΔABC maps onto ΔDEF

Using the SAS≅ Theorem

Example:
1. Write a two-column proof.

Given: $\overline{BC} \cong \overline{DA}$, $\overline{BC} \parallel \overline{DA}$
Prove: $\Delta ABC \cong \Delta CDA$

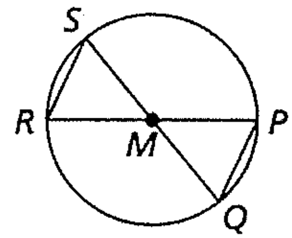


Statements	Reasons
① $\overline{BC} \cong \overline{DA}$, $\overline{BC} \parallel \overline{DA}$	① given
② $\overline{AC} \cong \overline{CA}$	② reflex. prop. ≅
③ ∠BCA ≅ ∠DAC	③ ∥ → alt. int. ∠s ≅
④ ΔABC ≅ ΔCDA	④ SAS ≅

Using SAS and Properties of Shapes

Example:

2. In the diagram, $\overline{QS}$ and $\overline{RP}$ pass through center M of the circle. Prove that $\Delta MRS \cong \Delta MPQ$.

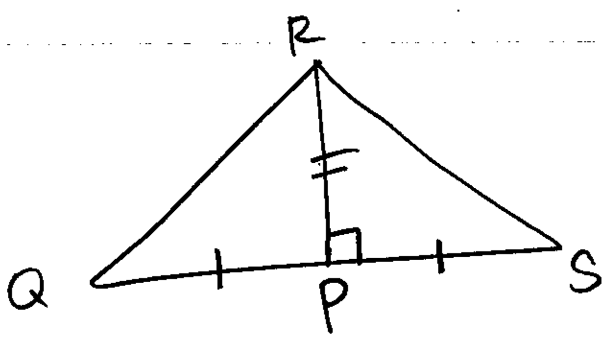


Statements	Reasons
① $\overline{QS}$, $\overline{RP}$ pass thru center M of ⊙	① given
② $\overline{SM}$, $\overline{RM}$, $\overline{PM}$, $\overline{QM}$ are radii	② def. of radius
③ $\overline{SM} \cong \overline{QM}$, $\overline{PM} \cong \overline{RM}$	③ all radii are ≅
④ $\angle SMR \cong \angle QMP$	④ vert. ∠s are ≅
⑤ $\Delta MRS \cong \Delta MPQ$	⑤ SAS ≅

Solving a Real-Life Problem

Example:

3. You are making a canvas sign to hang in the triangular portion of the barn wall, shown in the picture. You think you can use two identical triangular sheets of canvas. You know that $\overline{RP} \perp \overline{QS}$ and $\overline{PQ} \cong \overline{PS}$. Use the SAS≅ Theorem to show that $\Delta PQR \cong \Delta PSR$.



Statements	Reasons
① $\overline{RP} \perp \overline{QS}$, $\overline{PQ} \cong \overline{PS}$	① given
② $\overline{RP} \cong \overline{RP}$	② reflex. prop ≅
③ $\angle RPQ$, $\angle RPS$ are right ∠s	③ def. of ⊥ lines
④ $\angle RPQ \cong \angle RPS$	④ all right ∠s are ≅
⑤ $\Delta PQR \cong \Delta PSR$	⑤ SAS ≅