

Name:

Date:

Period: 2

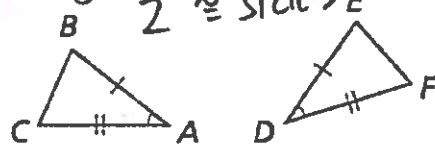
Side-Angle-Side Triangle Congruence

Lesson Objective: IWBAT use $SAS \cong$ to prove 2 Δ s are $\cong$

Side-Angle-Side Congruence Theorem ($SAS \cong$)

If two sides and the included angle of one triangle are $\cong$ to two sides and the included angle of a second triangle, then the two triangles are $\cong$.

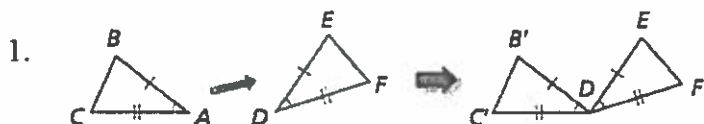
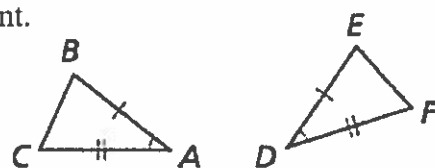
angle between 2 $\cong$ sides



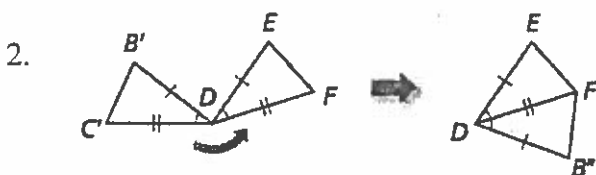
PROOF: Use transformations to prove why the two triangles are congruent.

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

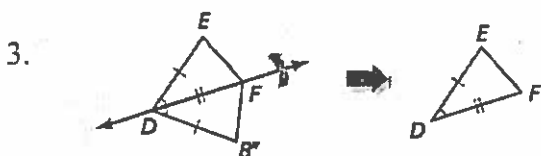
Prove: $\Delta ABC \cong \Delta DEF$



translation



rotation around D



reflect

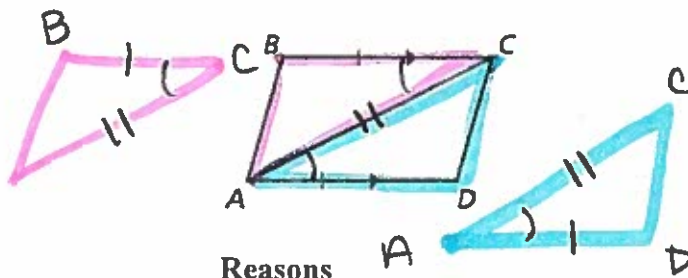
4. $\Delta ABC \cong \Delta DEF$ since a composition of rigid motions mapped one onto the other.

Using the $SAS \cong$ 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 $\overline{BC} \cong \overline{DA}$, $\overline{BC} \parallel \overline{DA}$

② $\overline{AC} \cong \overline{CA}$

③ $\angle BCA \cong \angle DAC$

④ $\Delta ABC \cong \Delta CDA$

① given

② reflex. prop. $\cong$

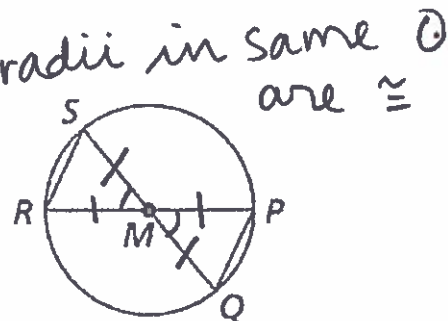
③ if $\parallel \rightarrow$ alt. int. $\angle$ s $\cong$

④ $SAS \cong$ ($\frac{1}{2}$, $\frac{3}{2}$, $\frac{2}{2}$)

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 $\triangle MRS \cong \triangle MPQ$.



Statements

Reasons

① circle w/ center M ,
diameters $\overline{QS}$ and $\overline{RP}$

① given

② $\overline{SM} \cong \overline{QM}$
 $\overline{RM} \cong \overline{PM}$

② radii in same $\odot$
are $\cong$

③ $\angle SMR \cong \angle QMP$

③ vertical $\angle$ s are $\cong$

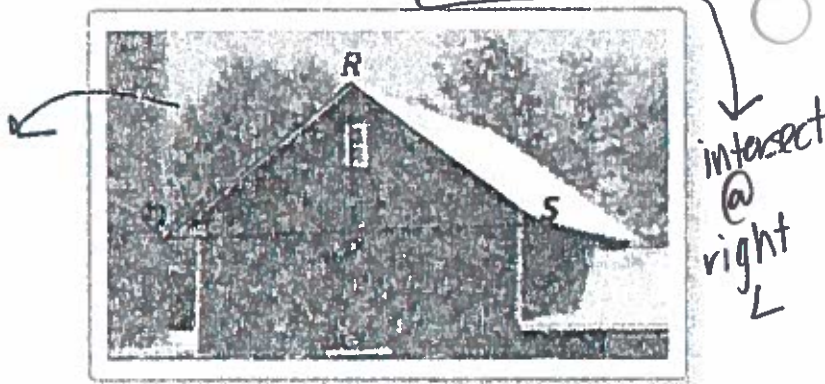
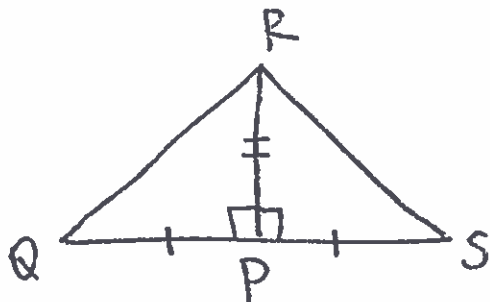
④ $\triangle MRS \cong \triangle MPQ$

④ SAS $\cong$ ($\frac{2}{S}$, $\frac{3}{A}$, $\frac{2}{S}$)

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 $\cong$ Theorem to show that $\triangle PQR \cong \triangle PSR$.



Statements

Reasons

① $\overline{RP} \perp \overline{QS}$, $\overline{PQ} \cong \overline{PS}$

① given

② $\overline{RP} \cong \overline{RP}$

② reflex. prop. $\cong$

③ $\angle RPS$ and $\angle RPQ$ are
right $\angle$ s

③ $\perp \rightarrow$ right $\angle$ s

④ $\angle RPS \cong \angle RPQ$

④ all right. $\angle$ s are $\cong$
(Rt. $\angle$ s $\cong$ Thm)

⑤ $\triangle RPQ \cong \triangle RPS$

⑤ SAS $\cong$ ($\frac{1}{S}$, $\frac{4}{A}$, $\frac{2}{S}$)