

Angle-Side-Angle Triangle Congruence

Lesson Objective INBAT prove 2 $\Delta s \cong$ by $ASA \cong$
and $AAS \cong$

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

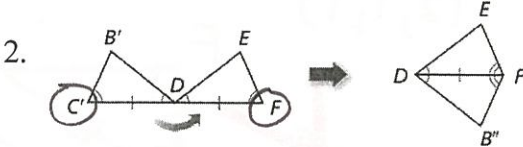
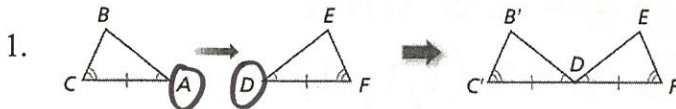
If two angles and the included side of one triangle are congruent to two angles and the included side of a second triangle, then the two triangle are congruent.



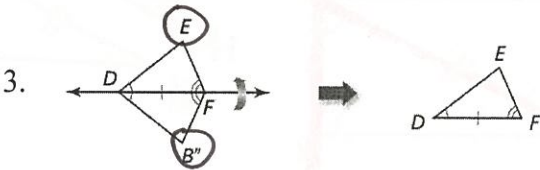
PROOF: Using transformations...

side btwn 2 $\cong$ angles

translation



rotation around D

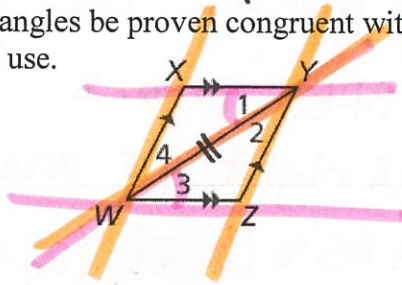
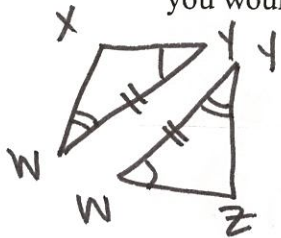


reflection

4. $\Delta ABC \cong \Delta DEF$ b/c a composition of rigid motions maps one onto the other.

Example:

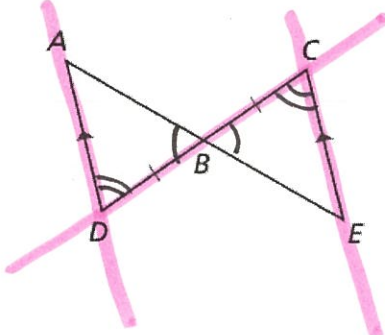
1. Can the triangles be proven congruent with the information given in the diagram? If so, state the theorem you would use.



$\angle 1 \cong \angle 3$ b/c $\overline{XY} \parallel \overline{ZW}$
 $\angle 2 \cong \angle 4$ b/c $\overline{XW} \parallel \overline{ZY}$
 $\overline{WY} \cong \overline{YW}$ b/c reflex. prop. $\cong$

so
 $\Delta XWY \cong \Delta ZWY$
by ASA

2. Write a two-column proof.
Given: $\overline{AD} \parallel \overline{EC}$, $\overline{BD} \cong \overline{BC}$
Prove: $\Delta ABD \cong \Delta EBC$



① $\overline{AD} \parallel \overline{EC}$
 $\overline{BD} \cong \overline{BC}$

② $\angle ABD \cong \angle EBC$

③ $\angle D \cong \angle C$

④ $\Delta ABD \cong \Delta EBC$

① Given

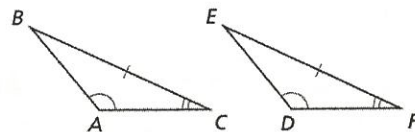
② vert. $\angle$'s $\cong$

③ $\parallel \rightarrow alt. \text{ int. } \angle$'s $\cong$

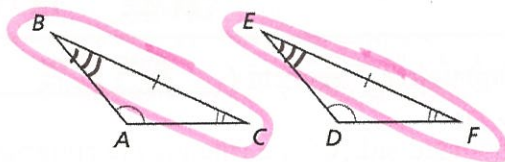
④ $ASA \cong (2, 1, 3)$
(3, 1, 2)

Angle-Angle-Side Congruence Theorem (AAS)

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.



PROOF: Given: $\angle A \cong \angle D$, $\angle C \cong \angle F$, $\overline{BC} \cong \overline{EF}$
 Prove: $\triangle ABC \cong \triangle DEF$



Statements

Reasons

- ① $\angle A \cong \angle D$, $\angle C \cong \angle F$, $\overline{BC} \cong \overline{EF}$
- ② $\angle B \cong \angle E$
- ③ $\triangle ABC \cong \triangle DEF$

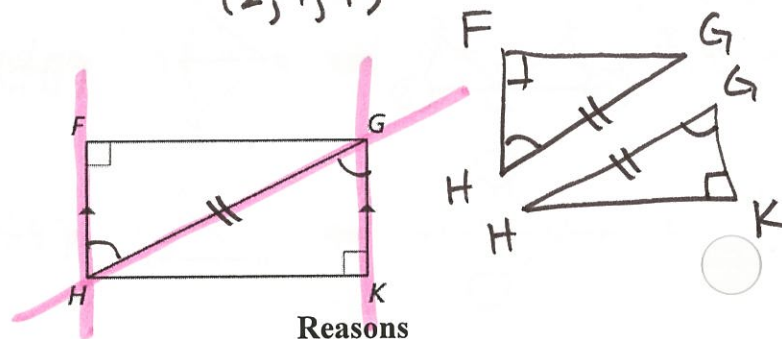
- ① Given
- ② 3rd $\angle$'s Thm
- ③ ASA $\cong$ (1, 1, 2)
(2, 1, 1)

Examples:

3. Write a two-column proof.

Given: $\overline{HF} \parallel \overline{GK}$, $\angle F$ and $\angle K$ are right angles

Prove: $\triangle HFG \cong \triangle GKH$



Statements

Reasons

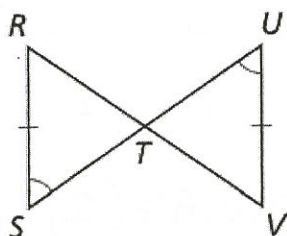
- ① $\overline{HF} \parallel \overline{GK}$
 $\angle F$ and $\angle K$ are rt. $\angle$'s
- ② $\angle FHG \cong \angle KGH$
- ③ $\overline{HG} \cong \overline{GH}$
- ④ $\angle F \cong \angle K$
- ⑤ $\triangle HFG \cong \triangle GKH$

- ① Given
- ② if $\parallel \rightarrow$ alt. int. $\angle$'s $\cong$
- ③ reflex. prop. $\cong$
- ④ all right $\angle$'s are $\cong$
- ⑤ AAS $\cong$ (1, 4, 3)

4. Write a two-column proof.

Given: the diagram

Prove: $\triangle RST \cong \triangle VUT$



Statements

Reasons

USE ASA $\cong$!!!!!!