Date: 12/13/21

Lesson 5.3/5.5/5.6 - Triangle Congruency

Learning Intent (Target): *Today I will* be able to determine whether or not triangles are congruent based on SSS, SAS, ASA, AAS Congruency.

Success Criteria: *I'll know I'll have it when* I can accuratley determine if triangles are congruent and write 2-column proofs using SSS, SAS, ASA, AAS Congruency for Triangles.

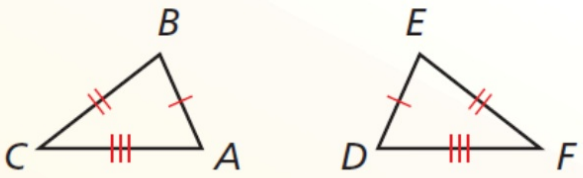
Accountable Team Task: *Therefore, I can* practice using interactive flip charts for notes and invstigations using gizmos & creating foldables.

Theorem

Theorem 5.8 Side-Side-Side (SSS) Congruence Theorem

If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are congruent.

If $\overline{AB} \cong \overline{DE}$, $\overline{BC} \cong \overline{EF}$, and $\overline{AC} \cong \overline{DF}$, then $\triangle ABC \cong \triangle DEF$.

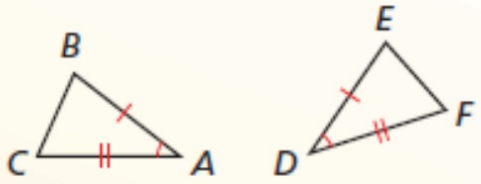


Theorem

Theorem 5.5 Side-Angle-Side (SAS) Congruence Theorem

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

If $\overline{AB} \cong \overline{DE}$, $\angle A \cong \angle D$, and $\overline{AC} \cong \overline{DF}$, then $\triangle ABC \cong \triangle DEF$.



Proof p. 246

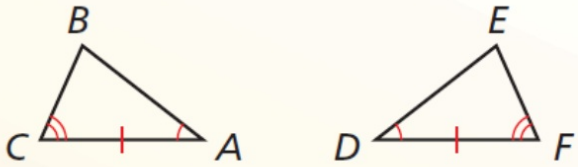
Theorem

Theorem 5.10 Angle-Side-Angle (ASA) Congruence Theorem

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 $\angle A \cong \angle D$, $\overline{AC} \cong \overline{DF}$, and $\angle C \cong \angle F$, then $\triangle ABC \cong \triangle DEF$.

Proof p. 270

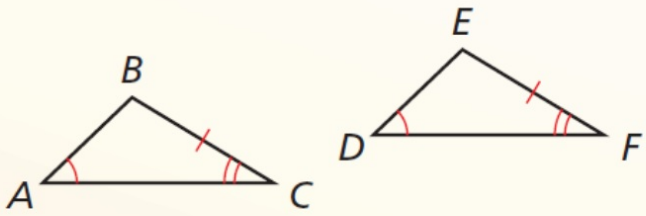


Theorem

Theorem 5.11 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 $\angle A \cong \angle D$, $\angle C \cong \angle F$, and $\overline{BC} \cong \overline{EF}$, then $\triangle ABC \cong \triangle DEF$.

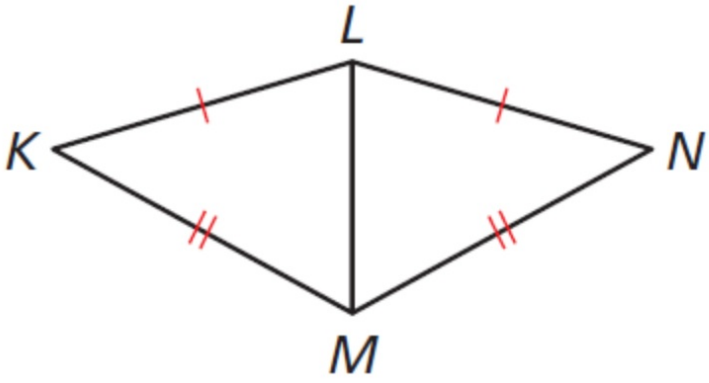


Proof p. 271

Write a proof.

Given $\overline{KL} \cong \overline{NL}$, $\overline{KM} \cong \overline{NM}$

Prove $\triangle KLM \cong \triangle NLM$

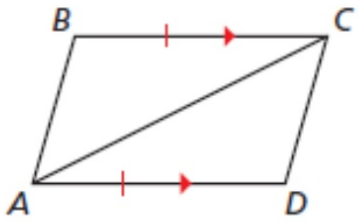


STATEMENTS	REASONS
S 1. $\overline{KL} \cong \overline{NL}$	1. Given
S 2. $\overline{KM} \cong \overline{NM}$	2. Given
S 3. $\overline{LM} \cong \overline{LM}$	3. Reflexive Property of Congruence (Thm. 2.1)
4. $\triangle KLM \cong \triangle NLM$	4. SSS Congruence Theorem

Write a proof.

Given $\overline{BC} \cong \overline{DA}, \ \overline{BC} \parallel \overline{AD}$

Prove $\triangle ABC \cong \triangle CDA$

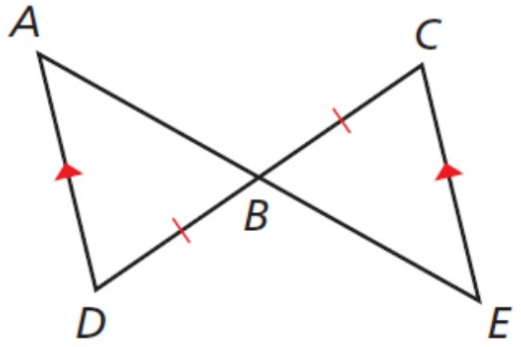


SOLUTION

STATEMENTS	REASONS
S 1. $\overline{BC} \cong \overline{DA}$	1. Given
2. $\overline{BC} \parallel \overline{AD}$	2. Given
A 3. $\angle BCA \cong \angle DAC$	3. Alternate Interior Angles Theorem (Thm. 3.2)
S 4. $\overline{AC} \cong \overline{CA}$	4. Reflexive Property of Congruence (Thm. 2.1)
5. $\triangle ABC \cong \triangle CDA$	5. SAS Congruence Theorem

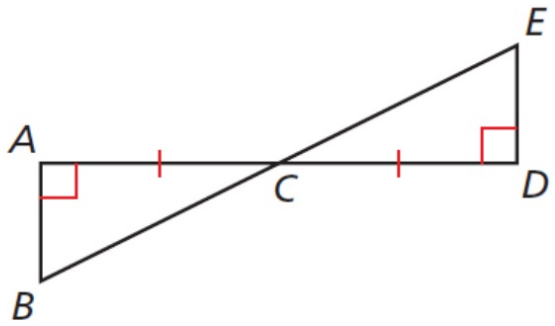
Write a proof.

Given $\overline{AD} \parallel \overline{EC}$, $\overline{BD} \cong \overline{BC}$
Prove $\triangle ABD \cong \triangle EBC$



STATEMENTS	REASONS
1. $\overline{AD} \parallel \overline{EC}$	1. Given
A 2. $\angle D \cong \angle C$	2. Alternate Interior Angles Theorem (Thm. 3.2)
S 3. $\overline{BD} \cong \overline{BC}$	3. Given
A 4. $\angle ABD \cong \angle EBC$	4. Vertical Angles Congruence Theorem (Thm 2.6)
5. $\triangle ABD \cong \triangle EBC$	5. ASA Congruence Theorem

2. In the diagram, $\overline{AB} \perp \overline{AD}$, $\overline{DE} \perp \overline{AD}$, and $\overline{AC} \cong \overline{DC}$. Prove $\triangle ABC \cong \triangle DEC$.

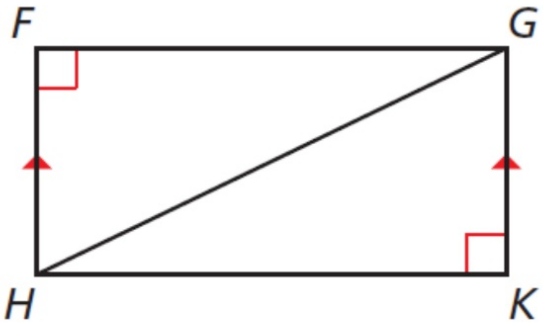


STATEMENTS	REASONS
1. $\overline{AB} \perp \overline{AD}$, $\overline{DE} \perp \overline{AD}$, $\overline{AC} \cong \overline{DC}$	1. Given
2. $\angle BAC$ and $\angle EDC$ are right angles.	2. Definition of perpendicular lines
3. $\angle BAC \cong \angle EDC$	3. Right Angles Congruence Theorem (Thm. 2.3)
4. $\angle ACB \cong \angle DCE$	4. Vertical Angles Congruence Theorem (Thm. 2.6)
5. $\triangle ABC \cong \triangle DEC$	5. ASA Congruence Theorem (Thm. 5.10)

Write a proof.

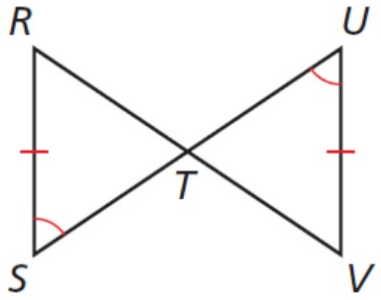
Given $\overline{HF} \parallel \overline{GK}$, $\angle F$ and $\angle K$ are right angles.

Prove $\triangle HFG \cong \triangle GKH$



STATEMENTS	REASONS
1. $\overline{HF} \parallel \overline{GK}$	1. Given
A 2. $\angle GHF \cong \angle HGK$	2. Alternate Interior Angles Theorem (Theorem 3.2)
3. $\angle F$ and $\angle K$ are right angles.	3. Given
A 4. $\angle F \cong \angle K$	4. Right Angles Congruence Theorem (Theorem 2.3)
S 5. $\overline{HG} \cong \overline{GH}$	5. Reflexive Property of Congruence (Theorem 2.1)
6. $\triangle HFG \cong \angle GKH$	6. AAS Congruence Theorem

3. In the diagram, $\angle S \cong \angle U$ and $\overline{RS} \cong \overline{VU}$. Prove $\triangle RST \cong \triangle VUT$.



STATEMENTS	REASONS
1. $\angle S \cong \angle U, \overline{RS} \cong \overline{VU}$	1. Given
2. $\angle RTS \cong \angle VTU$	2. Vertical Angles Congruence Theorem (Thm. 2.6)
3. $\triangle RST \cong \triangle VUT$	3. AAS Congruence Theorem (Thm. 5.11)