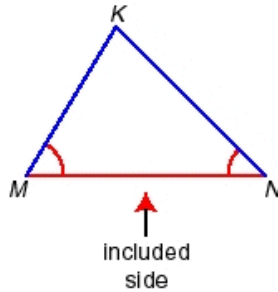




- I can use sides and angles to prove congruent.
  - I can prove triangles congruent using ASA.
  - I can prove triangle congruent using AAS.

**Vocabulary:**

An **included side** is the side that links two angles together. In the diagram below,  $\overline{MN}$  is the included side of  $\angle M$  and  $\angle N$ .

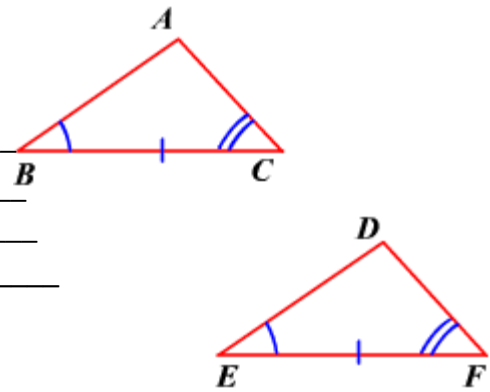


**ASA Congruence Theorem (ASA)**

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.

**Example:**

If **Angle**  $\angle B \cong$  \_\_\_\_\_  
**Side**  $\overline{BC} \cong$  \_\_\_\_\_  
**Angle**  $\angle C \cong$  \_\_\_\_\_  
 then,  $\triangle ABC \cong \triangle$  \_\_\_\_\_

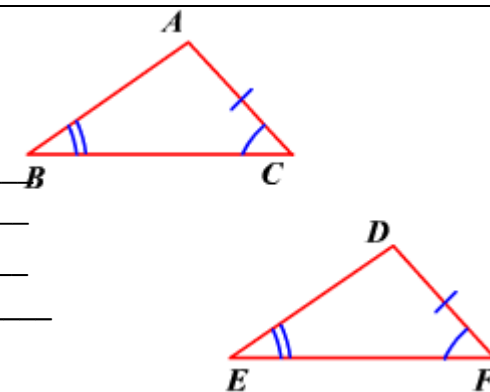


**AAS Congruence Theorem (AAS)**

If two angles and the 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.

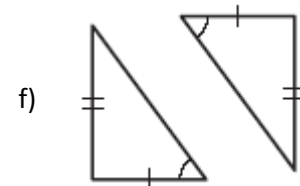
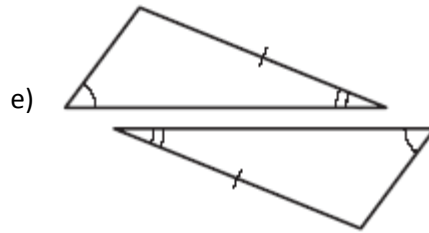
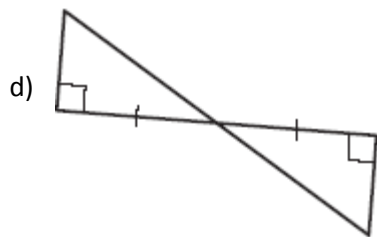
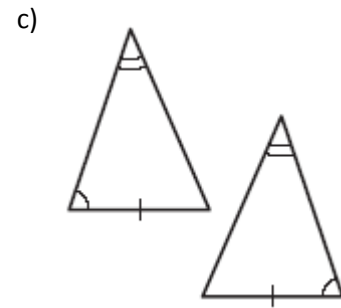
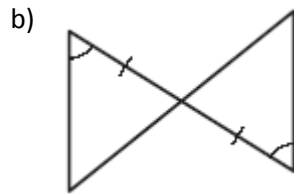
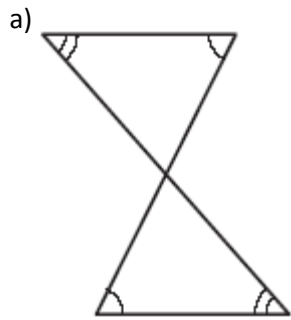
**Example:**

If **Angle**  $\angle C \cong$  \_\_\_\_\_  
**Angle**  $\angle B \cong$  \_\_\_\_\_  
**Side**  $\overline{AC} \cong$  \_\_\_\_\_  
 then  $\triangle ABC \cong \triangle$  \_\_\_\_\_



**Example 1: Identify Congruent Triangles**

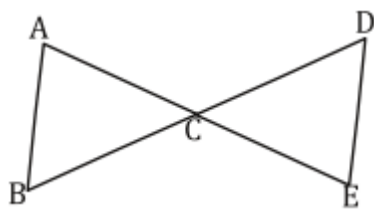
Can the triangles be proven congruent based on the given information in the diagram? If so, state the postulate or theorem you would use. If not, why not?



**Example 2: Proofs involving ASA and AAS**

a) **Given:**  $\overline{AE}$  bisects  $\overline{BD}$ ;  $\angle B \cong \angle D$

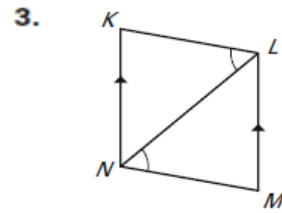
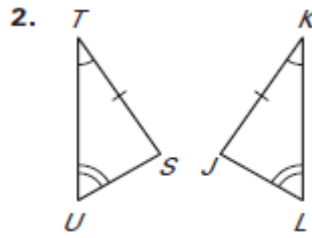
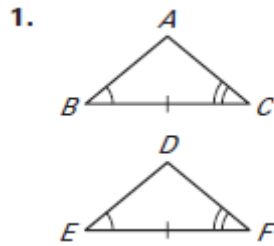
**Prove:**  $\triangle ABC \cong \triangle EDC$



Statements	Reasons
1. $\overline{AE}$ bisects $\overline{BD}$	1.
2.	2.
3. $\angle B \cong \angle D$	3.
4.	4.
5. $\triangle ABC \cong \triangle EDC$	5.



Is it possible to prove that the triangles are congruent? If so, state the postulate or theorem you would use.

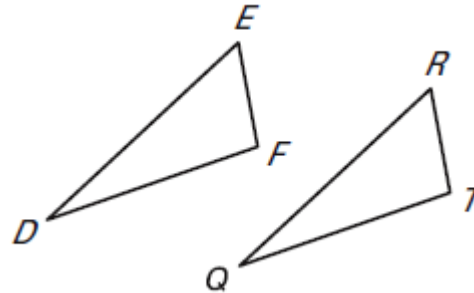


State the third congruence that is needed to prove that  $\triangle DEF \cong \triangle QRT$  using the given postulate or theorem.

4. Given:  $\angle D \cong \angle Q, \angle F \cong \angle T, \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$   
Use the AAS Congruence Theorem

5. Given:  $\angle E \cong \angle R, \overline{EF} \cong \overline{RT}, \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$   
Use the ASA Congruence Postulate

6. Given:  $\overline{DE} \cong \overline{QR}, \angle D \cong \angle Q, \underline{\hspace{1cm}} \cong \underline{\hspace{1cm}}$   
Use the SAS Congruence Postulate



Tell whether you can use the given information to determine whether  $\triangle JRM \cong \triangle XYZ$ . Explain your reasoning. (Hint: You may want to draw a diagram 😊)

7.  $\overline{JM} \cong \overline{XZ}, \angle M \cong \angle Y, \angle J \cong \angle X$

8.  $\overline{JM} \cong \overline{XZ}, \overline{JR} \cong \overline{YZ}, \angle J \cong \angle X$

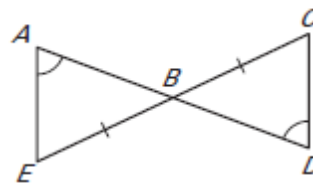
9.  $\angle J \cong \angle X, \angle M \cong \angle Z, \overline{RM} \cong \overline{YZ}$

10.  $\overline{JR} \cong \overline{YZ}, \overline{RM} \cong \overline{ZX}, \overline{MJ} \cong \overline{XY}$

11. Complete the proof.

Given :  $\overline{BE} \cong \overline{BC}$  ,  $\angle A \cong \angle D$

Prove :  $\triangle ABE \cong \triangle DBC$

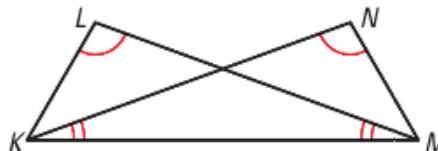


Statements	Reasons
1.	1. Given
2.	2. Given
3. $\angle ABE \cong \angle DBC$	3.
4. $\triangle ABE \cong \triangle DBC$	4.

12. Complete the proof.

Given :  $\angle NKM \cong \angle LMK$  ,  $\angle L \cong \angle N$

Prove :  $\triangle NMK \cong \triangle LKM$

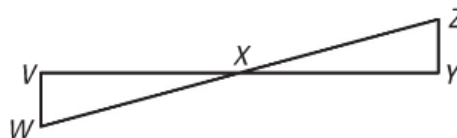


Statements	Reasons
1.	1. Given
2.	2. Given
3.	3. Reflexive Property
4. $\triangle NMK \cong \triangle LKM$	4.

13. Complete the proof.

Given : X is the midpoint of  $\overline{VY}$  ,  $\angle V \cong \angle Y$

Prove :  $\triangle VWX \cong \triangle YZX$

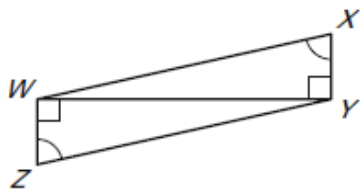


Statements	Reasons
1. X is the midpoint of $\overline{VY}$	1.
2. $\overline{VX} \cong$ _____	2.
3. $\angle V \cong \angle Y$	3.
4.	4.
5. $\triangle VWX \cong \triangle YZX$	5.

14. Complete the proof.

Given:  $\angle XYW \cong \angle ZWY$ ,  
 $\angle WXY \cong \angle YZW$

Prove:  $\triangle XYW \cong \triangle ZWY$

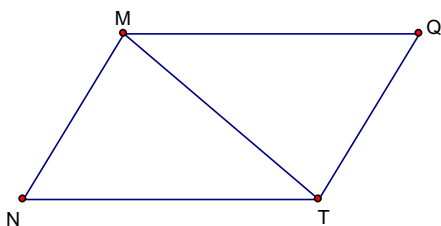


Statements	Reasons
1. $\angle XYW \cong \angle ZWY$	1.
2. $\angle WXY \cong \angle YZW$	2.
3. $\overline{WY} \cong \overline{WY}$	3.
4. $\triangle XYW \cong \triangle ZWY$	4.

15. Complete the proof.

Given:  $\overline{MQ} \parallel \overline{NT}$ ,  $\angle N \cong \angle Q$

Prove:  $\triangle QMT \cong \triangle NTM$

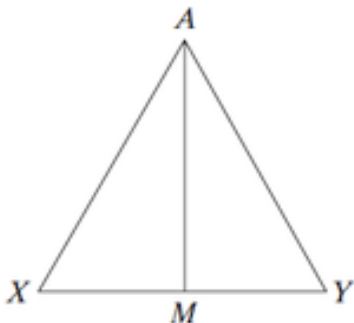


Statements	Reasons
1.	1. Given
2. $\angle N \cong \angle Q$	2.
3. $\angle QMT \cong \angle NTM$	3.
4. $\overline{MT} \cong \overline{MT}$	4.
5. $\triangle QMT \cong \triangle NTM$	5.

16. Complete the proof.

Given:  $\angle X \cong \angle Y$   
 $\overline{AM}$  bisects  $\angle XAY$

Prove:  $\triangle MAX \cong \triangle MAY$



Statements	Reasons
1. $\angle X \cong \angle Y$	1.
2.	2. Given
3.	3. Definition of angle bisector
4.	4. Reflexive Property
5. $\triangle MAX \cong \triangle MAY$	5.

**Answer Key :**

1. Yes, ASA

2. Yes, AAS

3. Yes, ASA

4.  $\overline{EF} \cong \overline{RT}$  or  $\overline{ED} \cong \overline{RQ}$

5.  $\angle F \cong \angle T$

6.  $\overline{FD} \cong \overline{TQ}$

7. No,  $\angle M$  is not congruent to  $\angle Y$

8. No,  $\overline{JR}$  is not congruent to  $\overline{YZ}$

9. Yes, by AAS

10. No,  $\overline{JR}$  is not congruent to  $\overline{YZ}$

11. 1)  $\overline{BE} \cong \overline{BC}$                       2)  $\angle A \cong \angle D$                       3) VAT                      4) AAS

12. 1)  $\angle NKM \cong \angle LMK$                       2)  $\angle L \cong \angle N$                       3)  $\overline{KM} \cong \overline{KM}$                       4) AAS

13. 1) Given    2)  $\overline{VX} \cong \overline{YX}$  ; Def. of Midpoint                      3) Given                      4)  $\angle VXW \cong \angle YXZ$  ; VAT                      5) ASA

14. 1) Given    2) Given                      3) Reflexive Prop.                      4) AAS

15. 1)  $\overline{MQ} \parallel \overline{NT}$                       2) Given                      3) Alt. Int. Angles Thm.                      4) Reflexive Prop.                      5) AAS

16. 1) Given    2)  $\overline{AM}$  bisects  $\angle XAY$     3)  $\angle XAM \cong \angle YAM$     4)  $\overline{AM} \cong \overline{AM}$                       5) AAS