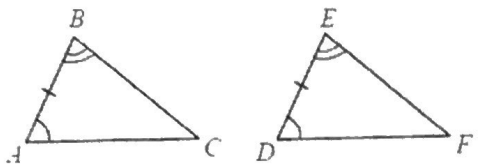
TRIANGLE CONGRUENCE: ASA & AAS

ANGLE-SIDE-ANGLE (ASA)

If two angles and the included side of one triangle are congruent to two angles and an included side of another triangle, then the triangles are congruent.



If $\angle A \cong \angle D$ (Angle)

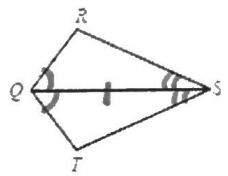
$\overline{AB} \cong \overline{DE}$ (Side)

$\angle B \cong \angle E$ (Angle)

then, $\triangle ABC \cong \triangle DEF$ by AJA

INCLUDED MEANS THE SIDE BETWEEN THE ANGLES!!

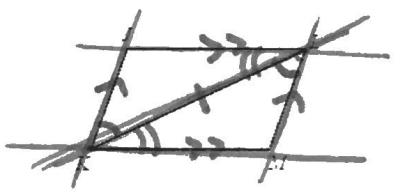
SAMPLE ASA PROOFS:



❶ **Given:** $\overline{SQ}$ bisects $\angle RQT$ and $\angle RST$
Prove: $\triangle QRS \cong \triangle QTS$

Statements	Reasons
1. $\overline{SQ}$ bisects $\angle RQT$ and $\angle RST$	1. Given
2. $\angle RQS \cong \angle TQS$ A	2. Def. of bisector
3. $\angle RSQ \cong \angle TSQ$ A	3. Def. of bisector
4. $\overline{QS} \cong \overline{QS}$ S	4. Reflexive PROP
5. $\triangle QRS \cong \triangle QTS$	5 ASA

❷ **Given:** $\overline{JK} \parallel \overline{LM}$, $\overline{JL} \parallel \overline{KM}$
Prove: $\triangle JKL \cong \triangle MLK$

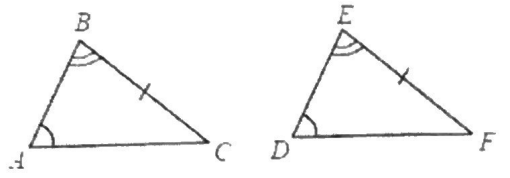


Statements	Reasons
1. $\overline{JK} \parallel \overline{LM}$, $\overline{JL} \parallel \overline{KM}$	1. Given
2. $\angle JKL \cong \angle MLK$ A	2. Alt. int $\angle$'s
3. $\angle JLK \cong \angle MKL$ A	3. Alt. int $\angle$'s
4. $\overline{KL} \cong \overline{KL}$ S	4. Reflexive PROP
5. $\triangle JKL \cong \triangle MLK$	5. ASA

3.9 Guided Notes (ASA, AAS, and HL Proofs)

ANGLE-ANGLE-SIDE (AAS)

If two angles and a non-included side of one triangle are congruent to two angles and a non-included side of another triangle, then the triangles are included.

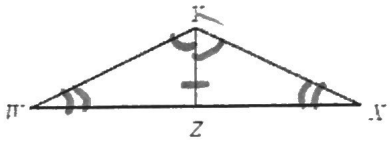


If $\angle A \cong \angle D$ (Angle)
$\angle B \cong \angle E$ (Angle)
$\overline{BC} \cong \overline{EF}$ (Side)
then, $\triangle CAB \cong \triangle FDE$ by AAS

NON-INCLUDED MEANS A SIDE OPPOSITE THE ANGLES!

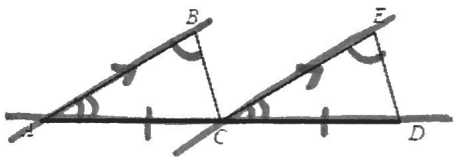
SAMPLE AAS PROOFS:

4 **Given:** $\overline{YZ}$ bisects $\angle WYX$, $\angle YWZ \cong \angle YXZ$
Prove: $\triangle WYZ \cong \triangle XYZ$



Statements	Reasons
1. $\overline{YZ}$ bisects $\angle WYX$	1. Given
2. $\angle WYZ \cong \angle XYZ$ A	2. Def. of Bisector
3. $\angle YWZ \cong \angle YXZ$ A	3. Given
4. $\overline{YZ} \cong \overline{YZ}$ S	4. Reflexive Prop
5. $\triangle WYZ \cong \triangle XYZ$	5. AAS

5 **Given:** $\angle ABC \cong \angle CED$, $\overline{AB} \parallel \overline{CE}$
C is the midpoint of $\overline{AD}$
Prove: $\triangle ABC \cong \triangle CED$

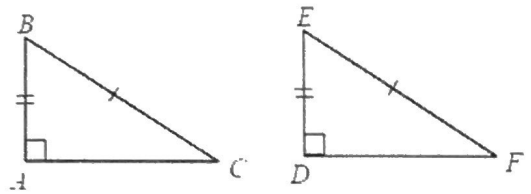


Statements	Reasons
1. $\angle ABC \cong \angle CED$ A	1. Given
2. $\overline{AB} \parallel \overline{CE}$	2. Given
3. $\angle BAC \cong \angle ECD$ A	3. Corresponding $\angle$'s
4. C is the mp of $\overline{AD}$	4. Given
5. $\overline{AC} \cong \overline{CD}$ S	5. Def. of midpoint
6. $\triangle ABC \cong \triangle CED$	6. AAS

RIGHT TRIANGLE CONGRUENCE: HL

HYPOTENUSE-LEG (HL)

If the hypotenuse and a leg of one right triangle is congruent to the hypotenuse and a leg of another right triangle then the triangles are congruent.



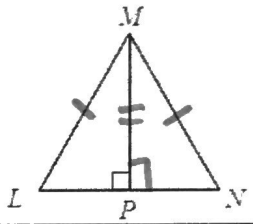
If $\overline{BC} \cong \overline{EF}$ (Hypotenuse)

$\overline{BA} \cong \overline{ED}$ (Leg)

then, $\triangle BAC \cong \triangle EDF$ by HL

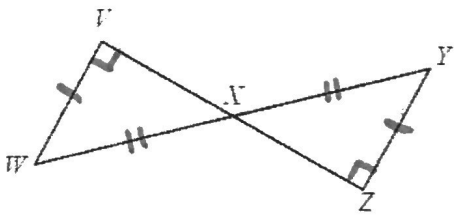
The **HYPOTENUSE** is the side opposite the right angle.
A **LEG** is a side adjacent to the right angle.

SAMPLE HL PROOFS:



❶ **Given:** $\triangle LMP$ and $\triangle MNP$ are right triangles, $\overline{ML} \cong \overline{MN}$
Prove: $\triangle LMP \cong \triangle MNP$

Statements	Reasons
1. $\triangle LMP$ and $\triangle MNP$ are right triangles	1. Given
2. $\overline{ML} \cong \overline{MN}$ H	2. Given
3. $\overline{MP} \cong \overline{MP}$ L	3. Reflexive Prop
4. $\triangle LMP \cong \triangle MNP$	4. HL



❷ **Given:** $\triangle WVX$ and $\triangle YZX$ are right triangles, $\overline{WV} \cong \overline{YZ}$
X is the midpoint of $\overline{WY}$
Prove: $\triangle WVX \cong \triangle YZX$

Statements	Reasons
1. $\triangle WVX$ & $\triangle YZX$ are rt $\triangle$'s	1. Given
2. $\overline{WV} \cong \overline{YZ}$ L	2. Given
3. X is the mp of $\overline{WY}$	3. Given
4. $\overline{WX} \cong \overline{XY}$ H	4. Def. of midpoint
5. $\triangle WVX \cong \triangle YZX$	5. HL