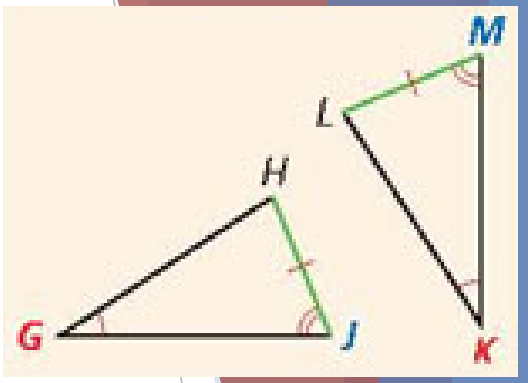
Proving Theorems

Proof of AAS Theorem



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

Given: $\angle G \cong \angle K; \angle J \cong \angle M; \overline{HJ} \cong \overline{LM}$

Prove: $\Delta GHJ \cong \Delta KLM$

Statements	Reasons

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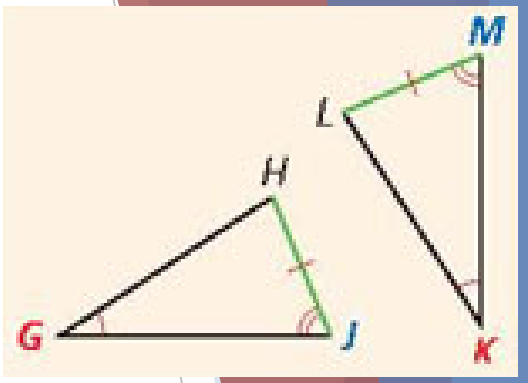

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Prove: $\Delta GHJ \cong \Delta KLM$

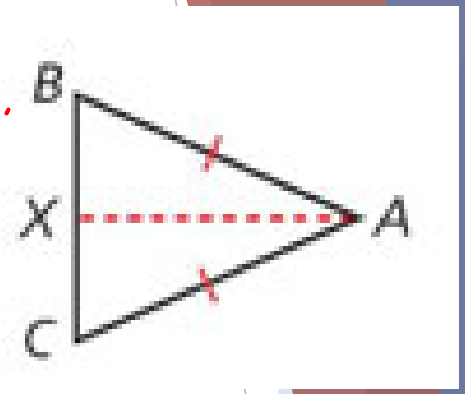
Statements	Reasons
1) $\angle G \cong \angle K; \angle J \cong \angle M; \overline{HJ} \cong \overline{LM}$	1) Given
2) $\angle H \cong \angle L$	2) Third Angles Theorem
3) $\Delta GHJ \cong \Delta KLM$	3) ASA Postulate

Proof of Isosceles Triangle Theorem

If two sides of a triangle are congruent, then the angles opposite the sides are congruent.

Given: $\overline{AB} \cong \overline{AC}$

Prove: $\angle B \cong \angle C$



Statements	Reasons
1) Draw X as midpoint of $\overline{BC}$	Every segment has one midpoint
2) Draw the aux. line $\overline{AX}$	Through any two points there is one line.
3)	
4)	
5)	
6)	
7)	

Proof of Isosceles Triangle Theorem

If two sides of a triangle are congruent, then the angles opposite the sides are congruent.

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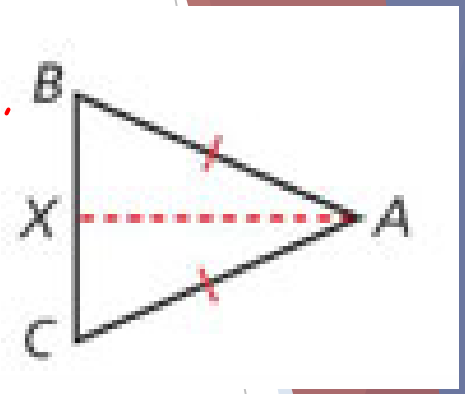
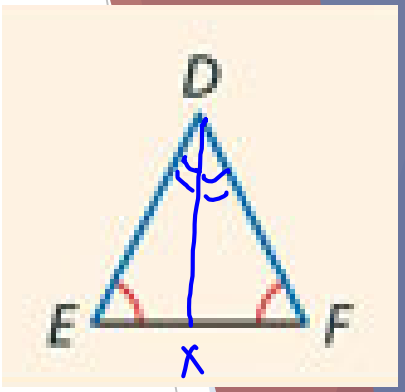


Statements	Reasons
1) Draw X as midpoint of $\overline{BC}$	Every segment has one midpoint
2) Draw the aux. line $\overline{AX}$	Through any two points there is one line.
3) $\overline{BX} \cong \overline{CX}$	Definition of midpoint
4) $\overline{AB} \cong \overline{AC}$	Given
5) $\overline{AX} \cong \overline{AX}$	Reflexive Property of Congruence
6) $\Delta ABX \cong \Delta ACX$	SSS Postulate
7) $\angle B \cong \angle C$	CPCTC

Proof of Converse of Isosceles Triangle Theorem



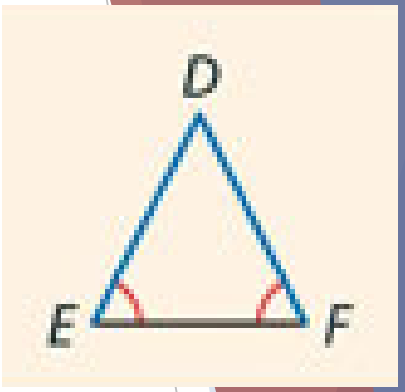
If two angles of a triangle are congruent, then the sides opposite the sides are congruent.

Given: $\angle E \cong \angle F$

Prove: $\overline{DE} \cong \overline{DF}$

Statements	Reasons
1) Draw $\overline{DX}$, the bisector of $\angle EDF$	Every angle has one bisector.
2)	
3)	
4)	
5)	
6)	

Proof of Converse of Isosceles Triangle Theorem



If two angles of a triangle are congruent, then the sides opposite the sides are congruent.

Given: $\angle E \cong \angle F$

Prove: $\overline{DE} \cong \overline{DF}$

Statements	Reasons
1) Draw $\overline{DX}$, the bisector of $\angle EDF$	Every angle has one bisector.
2) $\angle EDX \cong \angle FDX$	Definition of bisector
3) $\angle E \cong \angle F$	Given
4) $\overline{DX} \cong \overline{DX}$	Reflexive Property of Congruence
5) $\Delta DEX \cong \Delta DFX$	AAS Theorem
6) $\overline{DE} \cong \overline{DF}$	CPCTC