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7.2. Honors Geometry

DATE: 2/1

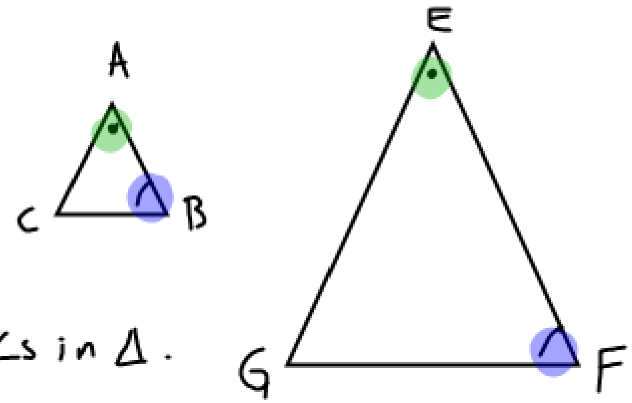
Target 6C. Use and apply special theorems to prove triangles congruent

No Choice Theorem: If two angles of one Δ are congruent to two angles of a second Δ, then the third angles are congruent. *(Important: Do the two Δs need to be congruent to apply the No Choice Theorem?* No!

Given: $\angle A \cong \angle E$

$\angle B \cong \angle F$

Prove: $\angle C \cong \angle G$



The proof is easy. Think about sum of ∠s in Δ.

AAS Theorem: If there exists a correspondence between the vertices of two Δs such that two angles and a non-included side of one are congruent to the corresponding parts of the other, then the Δs are congruent.

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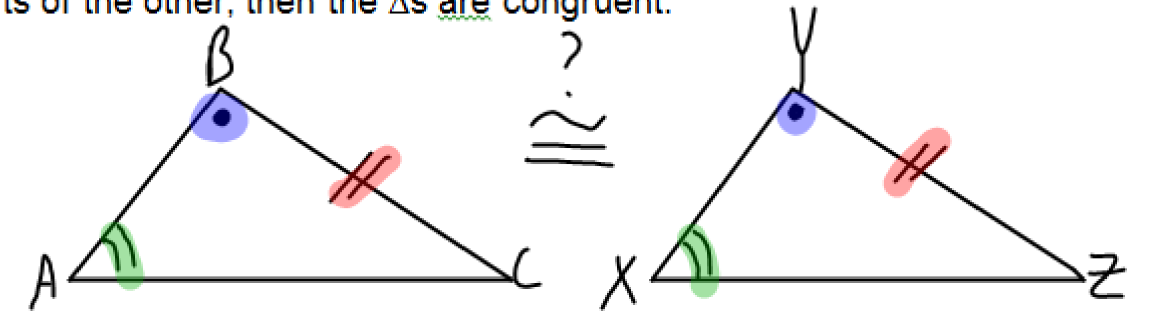
AAS Theorem: If there exists a correspondence between the vertices of two Δs such that two angles and a non-included side of one are congruent to the corresponding parts of the other, then the Δs are congruent.

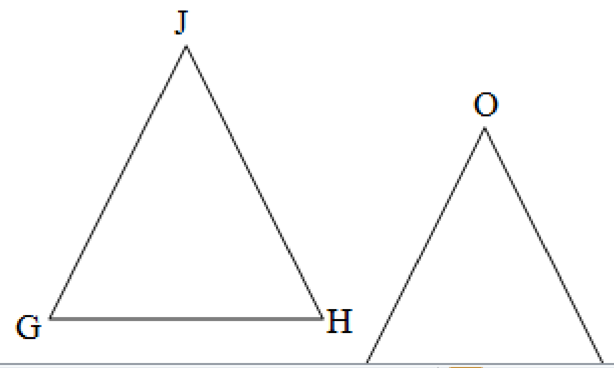


Yes, by AAS.

Examples

1) Given: ∠G≅∠K
∠H≅∠M
JH≅OM

Prove: ΔGHJ≅ΔKMO



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Examples

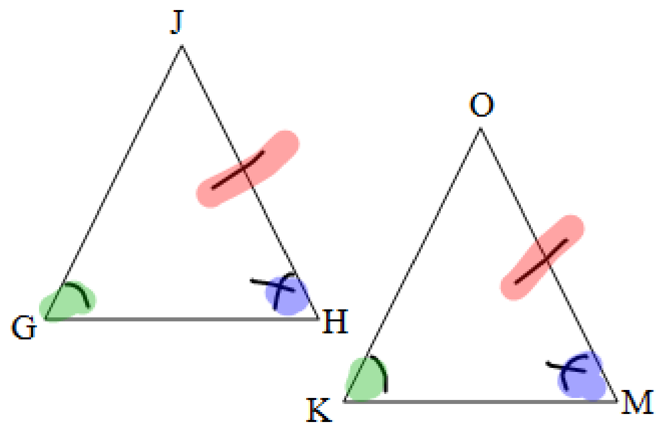
1) Given: $\angle G \cong \angle K$

$\angle H \cong \angle M$

$JH \cong OM$

Prove: $\Delta GHJ \cong \Delta KMO$

Statement	Reason
① $\angle G \cong \angle K$, $\angle H \cong \angle M$, $\overline{JH} \cong \overline{OM}$	① Given
② $\Delta GHJ \cong \Delta KMO$	② AAS



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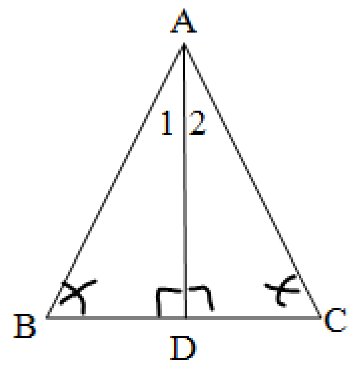
2) Given: $AD \perp BC$

$\angle B \cong \angle C$

Prove: $\angle 1 \cong \angle 2$



Statement	Reason
① $\overline{AD} \perp \overline{BC}$	① Given
② $\angle B \cong \angle C$	② Given
③ $\angle ADB, \angle ADC$ rt. $\angle$s	③ Def. $\perp$
④ $\angle ADB \cong \angle ADC$	④ Rt. $\angle$s $\cong$.
⑤ $\angle 1 \cong \angle 2$	⑤ No Choice Theorem

Fastest way!
other ways possible

3) Prove that the altitudes to the legs of an isosceles triangle are congruent.

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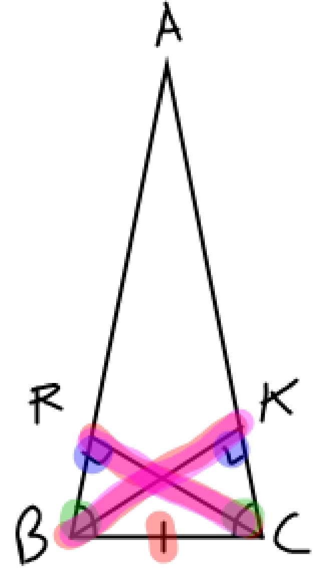
3) Prove that the altitudes to the legs of an isosceles triangle are congruent.

Statements	Reasons
① $\triangle ABC$ iso base $\overline{BC}$ $\overline{CR}$, $\overline{BK}$ alt.	① Given
② $\overline{AB} \cong \overline{AC}$	② Def. iso $\triangle$.
③ $\angle ABC \cong \angle ACB$	③ $\triangle \Rightarrow \triangle$
④ $\angle BRC$, $\angle CKB$ rt. $\angle$s	④ Def of alt.
⑤ $\angle BRC \cong \angle CKB$	⑤ Rt. $\angle$s $\cong$
⑥ $\overline{BC} \cong \overline{BC}$	⑥ Reflexive prop.
⑦ $\triangle RBC \cong \triangle KCB$	⑦ AAS (step 5, 3, 6)
⑧ $\overline{CR} \cong \overline{BK}$	⑧ CPCTC



Given: $\triangle ABC$ iso with base $\overline{BC}$
$\overline{CR}$ altitude to $\overline{AB}$
$\overline{BK}$ altitude to $\overline{AC}$

Prove: $\overline{CR} \cong \overline{BK}$

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