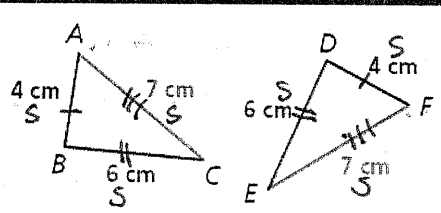


I. Side-Side-Side Congruence Postulate

Triangle Rigidity: If the side lengths of a triangle are given, then the triangle can have only one shape.

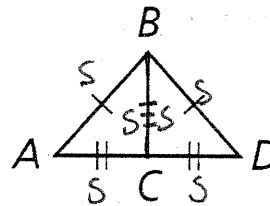
Postulate 4-4-1 Side-Side-Side (SSS) Congruence

POSTULATE	HYPOTHESIS	CONCLUSION
If <u>three sides of one triangle are congruent to three sides of another triangle</u> , then the triangles are congruent.		$\triangle ABC \cong \triangle FDE$

Example: Use SSS to explain why $\triangle ABC \cong \triangle DBC$.

What property would we be using to prove that $\overline{BC} \cong \overline{BC}$?

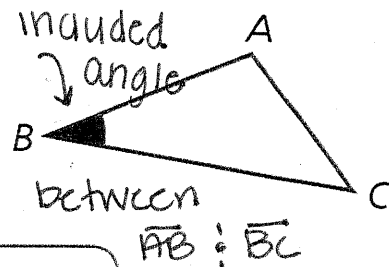
Reflexive Property
 to prove $\overline{BC} \cong \overline{BC}$
 It is a shared side!



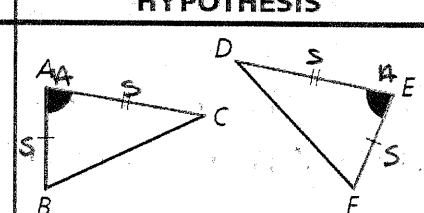
$\overline{AB} \cong \overline{DB}$ (given)
 $\overline{AC} \cong \overline{DC}$ (given)
 $\overline{BC} \cong \overline{BC}$ (reflex.)

II. Side-Angle-Side Congruence Postulate (SAS)

Included Angle: An angle formed by two adjacent sides of a polygon.

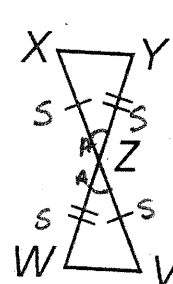


Postulate 4-4-2 Side-Angle-Side (SAS) Congruence

POSTULATE	HYPOTHESIS	CONCLUSION
If <u>two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle</u> , then the triangles are congruent.		$\triangle ABC \cong \triangle FED$

Example: The diagram shows part of the support structure for a tower. Use SAS to explain why $\triangle XYZ \cong \triangle VWZ$.

$\angle XZY \cong \angle VZW$
 because they are vertical angles!

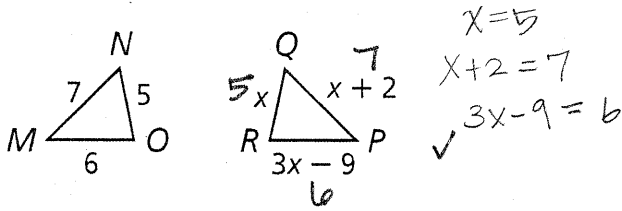


$\overline{XZ} \cong \overline{VZ}$ (given)
 $\overline{YZ} \cong \overline{WZ}$ (given)
 $\angle XZY \cong \angle VZW$ (v.a.)

III. Verifying Triangle Congruence

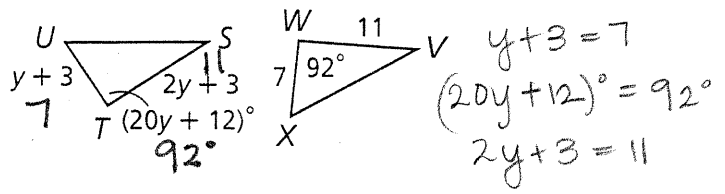
Example: Show that the triangles are congruent for the given value of the variable.

a. $\triangle MNO \cong \triangle PQR$ when $x = 5$.



SSS
(all sides are congruent!)

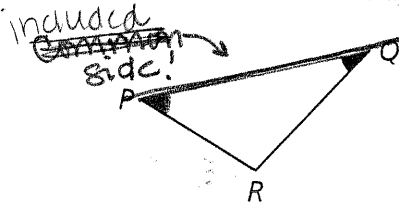
b. $\triangle STU \cong \triangle VWX$ when $y = 4$.



SAS
(two sides & the included angle are congruent)

IV. Angle-Side-Angle Congruence (ASA)

Included Side: the common side of two consecutive angles in a polygon.

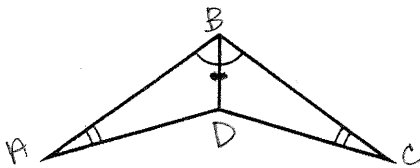


\overline{PQ} is the included side of $\angle P$ and $\angle Q$.

Postulate 4-5-1 Angle-Side-Angle (ASA) Congruence

POSTULATE	HYPOTHESIS	CONCLUSION
If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.		$\triangle ABC \cong \triangle DEF$

Example: Determine if you can use ASA to prove the triangles congruent. Explain.



NO, they share a side, but it isn't the included side!

Ex: which sides must be congruent?

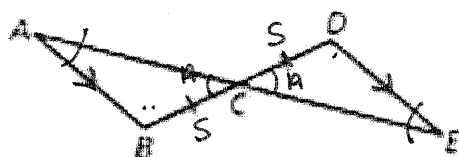
$\overline{AB} \cong \overline{CB}$

V. Angle-Angle-Side Congruence (AAS)

Theorem 4-5-2 Angle-Angle-Side (AAS) Congruence

THEOREM	HYPOTHESIS	CONCLUSION
If <u>two angles and a nonincluded side of one triangle are congruent to the corresponding angles and nonincluded side of another triangle</u> , then the triangles are congruent.		$\triangle GHJ \cong \triangle KLM$

Example: Given the figure below, state the piece of information you would use to prove that the triangles are congruent using AAS.



$$\angle ACB \cong \angle ECD \text{ (V.A.)}$$

AND

$$\angle A \cong \angle E$$

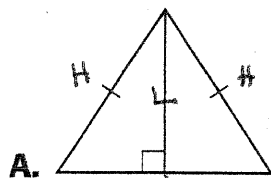
alt. int. \angle s

VI. Hypotenuse-Leg Congruence (HL)

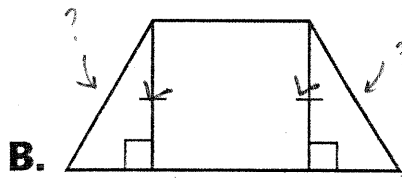
Theorem 4-5-3 Hypotenuse-Leg (HL) Congruence

THEOREM	HYPOTHESIS	CONCLUSION
If the <u>hypotenuse and a leg of a right triangle are congruent to the hypotenuse and a leg of another right triangle</u> , then the triangles are congruent.		$\triangle ABC \cong \triangle DEF$

Example: Determine if you can use the HL Congruence Theorem to prove the triangles congruent. If not, tell what else you need to know.



* YES *
The leg is also
a shared side so
 \triangle must be \cong !

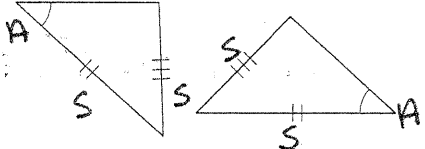


* NO *
Dont know if the
hypotenuse is
congruent.

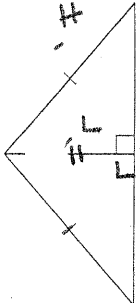
★ NO Angle-side-side postulate! ★

Notes - Sections 4.4 and 4.5 (Examples)

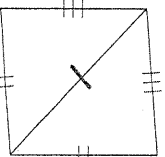
State if the two triangles are congruent. If they are, state how you know.

1) 

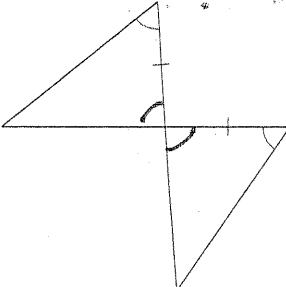
No Postulate doesn't exist!

2) 

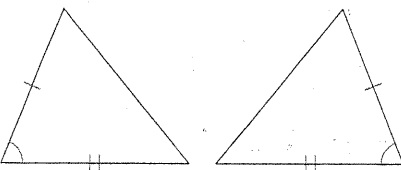
HL Post.

3) 

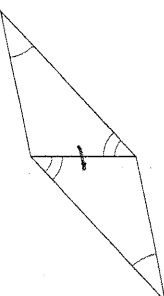
yes
SSS, shared side

4) 

yes
ASA, vertical angles

5) 

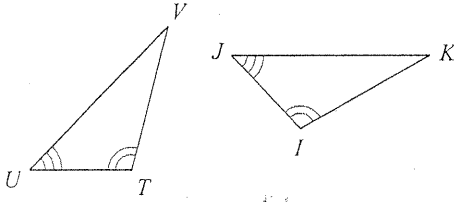
YES, SAS
2 sides and the included angle of one Δ are congruent to 2 sides and the included angle of the other Δ .

6) 

yes
AAS, shared side

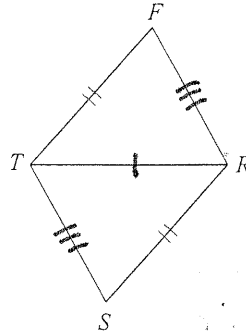
State what additional information is required in order to know that the triangles are congruent for the reason given.

7) AAS



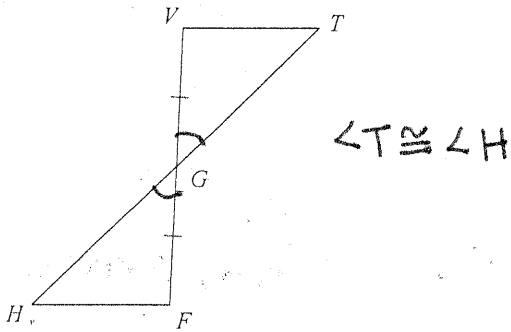
must have: $\overline{UV} \cong \overline{JK}$
OR $\overline{TV} \cong \overline{IK}$

8) SSS



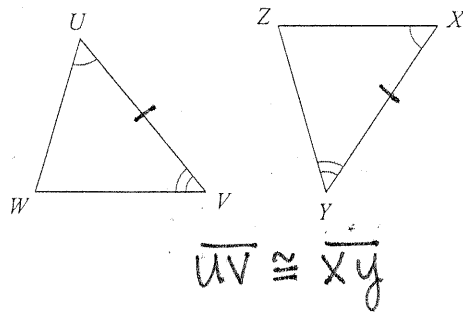
must have: $\overline{FR} \cong \overline{ST}$

9) AAS



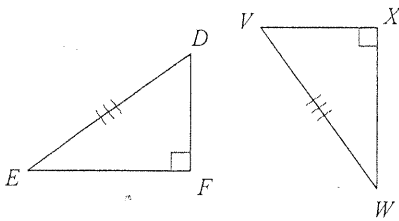
$\angle T \cong \angle H$

10) ASA



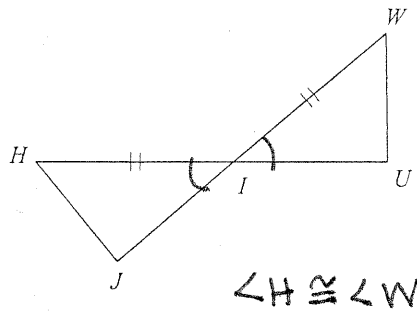
$\overline{UV} \cong \overline{XY}$

11) HL



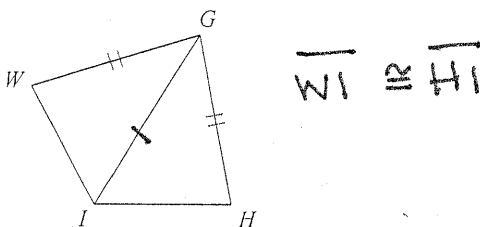
$\overline{DF} \cong \overline{VX}$
OR $\overline{EF} \cong \overline{WX}$

12) ASA



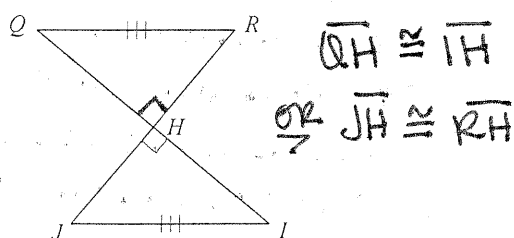
$\angle H \cong \angle W$

13) SSS



$\overline{WI} \cong \overline{HI}$

14) HL



$\overline{QH} \cong \overline{JH}$
OR $\overline{JH} \cong \overline{RH}$