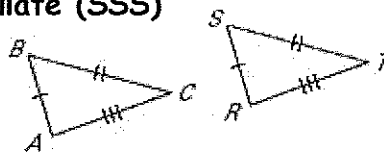


## 5.2 Prove Triangles Congruent by SSS, SAS, and HL

### SIDE-SIDE-SIDE Congruence Postulate (SSS)

If three sides of one triangle are congruent to three sides of a second triangle, then the two triangles are congruent.



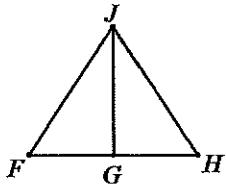
If Side  $\overline{AB} \cong \overline{RS}$   
 Side  $\overline{BC} \cong \overline{ST}$   
 Side  $\overline{CA} \cong \overline{TR}$   
 Then  $\triangle ABC \cong \triangle RST$

### Example 1: Use SSS Congruence Postulate

1. Given:  $\overline{FJ} \cong \overline{HJ}$ ;

$G$  is the midpoint of  $\overline{FH}$

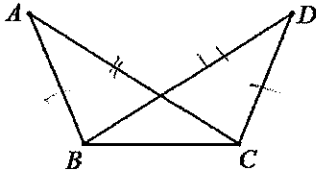
Prove:  $\triangle FGJ \cong \triangle HGJ$



Statements	Reasons
1. $\overline{FJ} \cong \overline{HJ}$ ; $G$ is the midpoint of $\overline{FH}$	1. GIVEN
2. $\overline{FG} \cong \overline{GH}$	2. DEF OF MIDDLEPOINT
3. $\overline{JG} \cong \overline{JG}$	3. REFLEXIVE PROPERTY
4. $\triangle FGJ \cong \triangle HGJ$	4. SSS POSTULATE

2. Given:  $\overline{AB} \cong \overline{DC}$ ;  $\overline{AC} \cong \overline{DB}$

Prove:  $\triangle ABC \cong \triangle DCB$



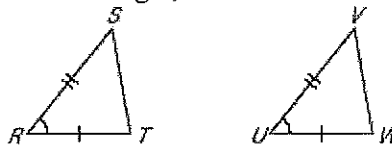
When  $\Delta$ 's overlap, look for

Statements	Reasons
1. $\overline{AB} \cong \overline{DC}$ ; $\overline{AC} \cong \overline{DB}$	1. GIVEN
2. $\overline{BC} \cong \overline{BC}$	2. REFLEXIVE PROPERTY
3. $\triangle ABC \cong \triangle DCB$	3. SSS

### SIDE-ANGLE-SIDE Congruence Theorem (SAS)

If two sides and the included angle of one triangle are congruent to two sides and the included angle of a second triangle, then the two triangles are congruent.

The angle must be right in between the two sides!



If Side  $\overline{RS} \cong \overline{UV}$   
 Angle  $\angle R \cong \angle U$   
 Side  $\overline{RT} \cong \overline{WU}$ ,  
 Then  $\triangle RST \cong \triangle VWU$

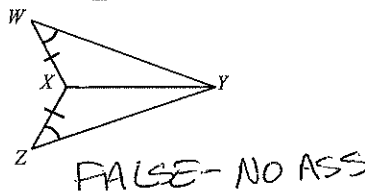
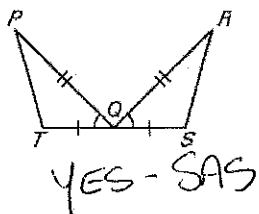
### Example 2: SAS vs. Potty Mouth

Decide whether enough information is given to prove that the triangles are congruent using the SAS Congruence Postulate. Please state any theorems or postulates you use.

a. True or False:  $\triangle PQT \cong \triangle RQS$ ?

b. True or False:  $\triangle WXY \cong \triangle ZXY$ ?

c. True or False:  $\triangle NKJ \cong \triangle LKM$ ?



**Skills Practice**

**SSS and SAS**

Write a congruence statement for each pair of triangles represented.

1.  $\overline{AC} \cong \overline{NO}$ ,  $\overline{CL} \cong \overline{OP}$ ,  $\angle C \cong \angle O$   
 $\triangle ACL \cong \triangle NOP$

2.  $\overline{WX} \cong \overline{AB}$ ,  $\overline{XZ} \cong \overline{BC}$ ,  $\overline{WZ} \cong \overline{AC}$   
 $\triangle WXZ \cong \triangle ABC$

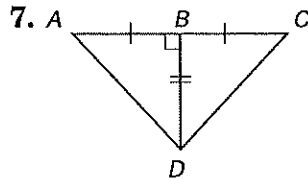
3.  $\overline{EG} \cong \overline{PS}$ ,  $\overline{EH} \cong \overline{PT}$ ,  $\angle E \cong \angle P$   
 $\triangle EGH \cong \triangle PST$

4.  $\overline{HY} \cong \overline{RN}$ ,  $\overline{EY} \cong \overline{AP}$ ,  $\angle Y \cong \angle P$   
 $\triangle HEY \cong \triangle RAP$

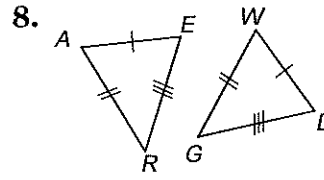
5.  $\overline{ZA} \cong \overline{QR}$ ,  $\overline{AP} \cong \overline{RS}$ ,  $\overline{ZP} \cong \overline{QS}$   
 $\triangle ZAP \cong \triangle QRS$

6.  $\overline{ML} \cong \overline{ZN}$ ,  $\overline{LR} \cong \overline{NB}$ ,  $\angle L \cong \angle N$   
 $\triangle MRL \cong \triangle ZBN$

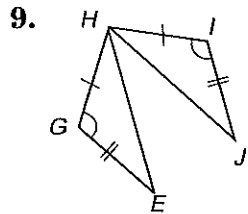
Determine whether each pair of triangles is congruent. If so, write a congruence statement and explain why the triangles are congruent.



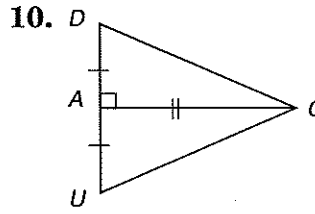
$\triangle ABD \cong \triangle CBD$ ; SAS



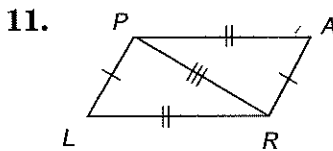
$\triangle AER \cong \triangle WDG$ ; SSS



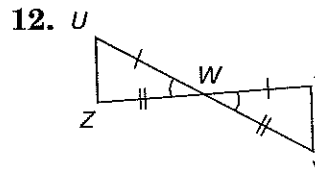
$\triangle HGE \cong \triangle HIJ$ ; SAS



$\triangle QAD \cong \triangle QAU$ ; SAS



$\triangle PLR \cong \triangle RAP$ ; SSS



$\triangle UWZ \cong \triangle XWY$ ; SAS

Use the given information to determine whether the two triangles are congruent by SAS. Write yes or no.

13.  $\angle L \cong \angle M$ ,  $\overline{LD} \cong \overline{MR}$ ,  $\overline{LO} \cong \overline{MA}$  **yes**

14.  $\angle L \cong \angle M$ ,  $\overline{LD} \cong \overline{MR}$ ,  $\angle O \cong \angle A$ , **no**

15.  $\overline{LD} \cong \overline{MR}$ ,  $\overline{LO} \cong \overline{MA}$ ,  $\angle O \cong \angle A$ , **no**

16.  $\overline{LD} \cong \overline{MR}$ ,  $\overline{LO} \cong \overline{MA}$ ,  $\angle DO \cong \angle RA$  **no**

