

Write equations when possible and solve for the value of each variable.

1.  $\frac{180}{-34} \div 2 \rightarrow \frac{146}{2} = 73$

$y = 73$   
 $73 + x = 180$   
 $x = 107$

2.  $3x+1$ ,  $19$ ,  $22$ ,  $48^\circ$ ,  $y^\circ$

$2y + 48 = 180$   
 $2y = 132$   
 $y = 66$   
 $3x + 1 = 22$   
 $x = 7$

3.  $2x+2$ ,  $52^\circ$ ,  $2x-4$ ,  $x+5$ ,  $y^\circ$

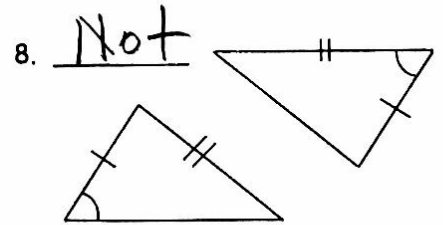
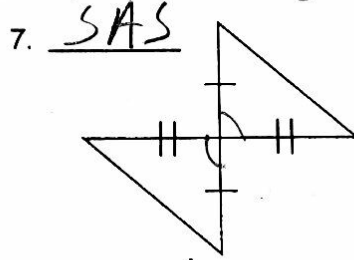
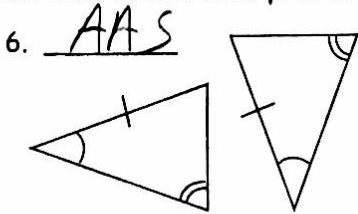
$104 + y = 180$   
 $y = 76$   
 $2x - 4 = x + 5$   
 $x = 9$

4.  $2x^\circ$ ,  $27^\circ$ ,  $85^\circ$ ,  $y^\circ$

$68 + 2x = 180$   
 $2x = 112$   
 $x = 56$   
 $27 + 85 + y = 180$   
 $112 + y = 180$   
 $y = 68$

5. The lengths of the sides of a triangle are  $4x$ ,  $2x + 10$ , and  $7x - 15$ . Is there a value of  $x$  that makes the triangle equilateral? Justify your answer.  
 $4x = 2x + 10$        $2x + 10 = 7x - 15$        $4x = 7x - 15$   
 $x = 5$        $5x = 25$        $3x = 15$   
 $x = 5$        $x = 5$        $x = 5$

State the reason that proves congruence, or write *not congruent*.

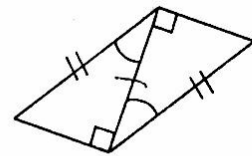
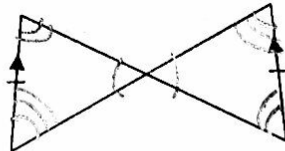
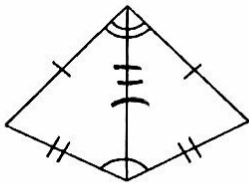


Mark your diagram and state two reasons that prove congruence.

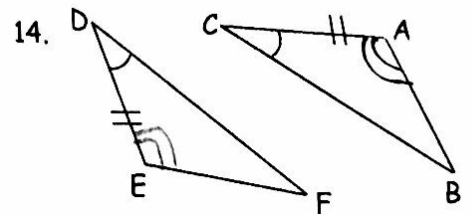
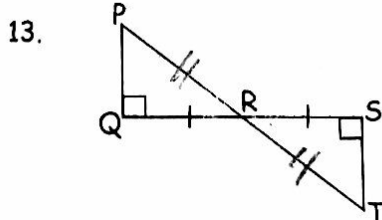
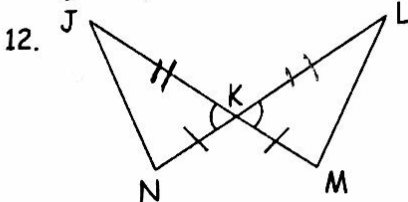
9. SSS and ASA

10. ASA and AAS

11. ASA and HL



Mark your diagram and state the corresponding side or angle pair that is needed in order to use the given postulate or theorem. State all congruent pairs in the corresponding boxes below.



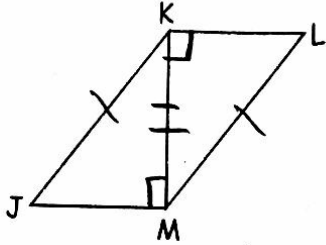
S	$\overline{JK} \cong \overline{LM}$
A	$\angle JKN \cong \angle LKM$
S	$\overline{NK} \cong \overline{MK}$

R	$\angle PQR \cong \angle TSR$
H	$\overline{PR} \cong \overline{TR}$
L	$\overline{QR} \cong \overline{SR}$

A	$\angle D \cong \angle C$
S	$\overline{ED} \cong \overline{AC}$
A	$\angle E \cong \angle A$

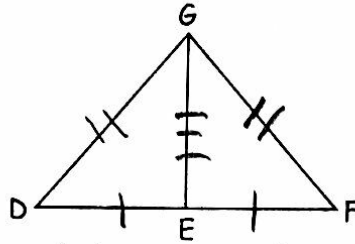
- A. Use the given information to mark all congruent parts in the diagram.  
 B. Identify the postulate or theorem that proves the two triangles are congruent.  
 If they are not congruent, write *not congruent*.  
 C. If they are congruent, write a congruence statement.

15.  $\angle JMK$  and  $\angle LKM$  are right angles;  $\overline{KJ} \cong \overline{LM}$



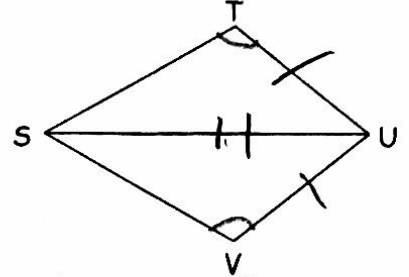
$\triangle JMK \cong \triangle LKM$   
by the HL thm

16. E is the midpoint of  $\overline{DF}$ ;  $\overline{DG} \cong \overline{FG}$



$\triangle GED \cong \triangle GEF$   
by the SSS Post

17.  $\angle T \cong \angle V$ ;  $\overline{TU} \cong \overline{VU}$



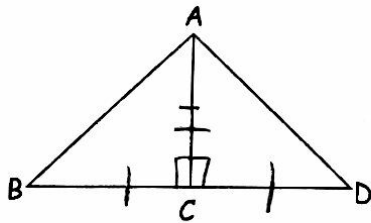
Not  
Congruent

Mark your diagrams appropriately and complete the 2-column proofs below.

18. Given: C is the midpoint of  $\overline{BD}$

$\overline{AC} \perp \overline{BD}$

Prove:  $\overline{AB} \cong \overline{AD}$

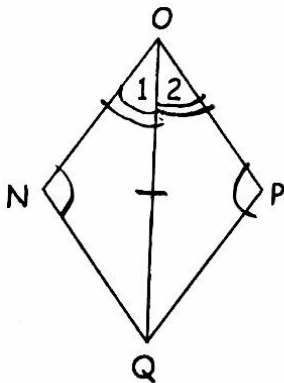


Statement	Reason
1. C is the midpoint of $\overline{BD}$	1. Given
2. $\overline{BC} \cong \overline{DC}$	2. Def. of Midpt.
3. $\overline{AC} \perp \overline{BD}$	3. Given
4. $\angle ACB \cong \angle ACD$	4. Def. of $\perp$ lines
5. $\overline{AC} \cong \overline{AC}$	5. Reflexive
6. $\triangle ABC \cong \triangle ADC$	6. SAS Post.
7. $\overline{AB} \cong \overline{AD}$	7. CPCTC

19. Given:  $\overline{OQ}$  bisects  $\angle NOP$ ;

$\angle N \cong \angle P$

Prove:  $\angle NQO \cong \angle PQO$



Statement	Reason
1. $\overline{OQ}$ bisects $\angle NOP$ ; $\angle N \cong \angle P$	1. Given
2. $\angle 1 \cong \angle 2$	2. Def. of $\angle$ bisector
3. $\overline{OQ} \cong \overline{OQ}$	3. Reflexive
4. $\triangle NQO \cong \triangle PQO$	4. AAS Theorem
5. $\angle NQO \cong \angle PQO$	5. CPCTC