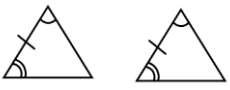
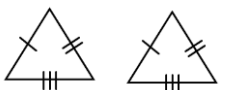
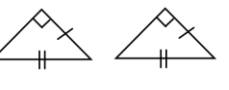
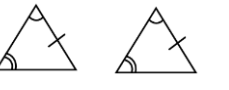




Semester 2 Final Review J  
Proving Triangles Congruent

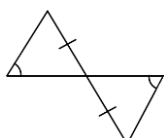
There are 5 congruence properties: SSS, SAS, HL, ASA & AAS. Identify the congruence property in use.

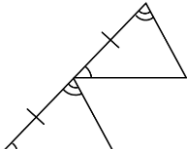
1. 	2. 	3. 	4. 	5. 
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**Example:**

For which drawing can you use the given information, and the AAS Congruence Theorem to prove that the triangles are congruent?

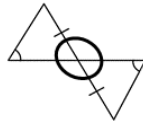
A. 

B. 

C. 

AAS uses two angle pairs and the side that **is not** between them. "A" uses SSS (because all three sides have matches) and "C" uses ASA (because there are two marked angles and the side in-between them is also marked congruent).

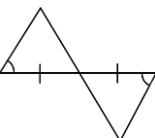
For "B," the vertical angles in the middle need to be marked congruent.




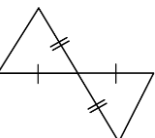
Once you identify that angle pair, you have two sets of congruent angle pairs and one set of congruent side pairs (making our choices ASA or AAS). Since the side is **not** in between the two angles, though, we know its congruence property has to be AAS.

**The answer is B.**


6. For which drawing can you use the given information, and the SSS Congruence Theorem to prove that the triangles are congruent?

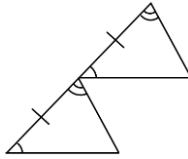
A. 

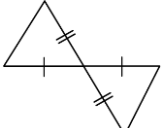
B. 

C. 

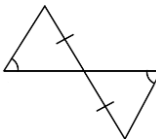
7. For which drawing can you use the given information, and the HL Congruence Theorem to prove that the triangles are congruent?


A. 

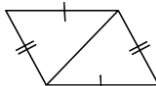
B. 

C. 

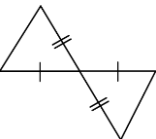
8. For which drawing can you use the given information, and the SAS Congruence Theorem to prove that the triangles are congruent?

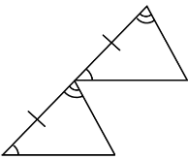
A. 


B. 

C. 

9. For which drawing can you use the given information, and the ASA Congruence Theorem to prove that the triangles are congruent?

A. 

B. 

C. 

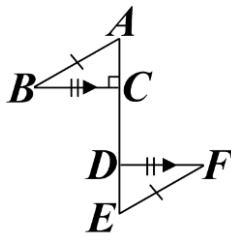
There are 5 congruence properties: SSS, SAS, HL, ASA & AAS. Identify the congruence property in use.

10. $\angle LMN \cong \angle PQR$ $\angle MNL \cong \angle QRP$ $\overline{LM} \cong \overline{PQ}$	11. $m\angle DEF = 90^\circ$ & $m\angle GHI = 90^\circ$ $\overline{DE} \cong \overline{GH}$ $\overline{EF} \cong \overline{HI}$	12. $\angle ABC \cong \angle STV$ $\angle CAB \cong \angle VST$ $\overline{AB} \cong \overline{ST}$	13. $m\angle ABC = 90^\circ$ & $m\angle KLM = 90^\circ$ $\overline{AC} \cong \overline{KM}$ $\overline{BC} \cong \overline{LM}$	14. $\overline{RS} \cong \overline{KM}$ $\overline{ST} \cong \overline{MN}$ $\overline{RT} \cong \overline{KN}$
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There are 4 parallel lines properties: Corresponding Angles Postulate, Alternate Interior Angles Theorem, Alternate Exterior Angles Theorem & Same Side Interior Angles Theorem. Identify the property in use.

15.  $\angle ACB \cong \angle FDE$	16.  $\angle ACB \cong \angle DEF$	17.  $m\angle ABC + m\angle EDC = 180$	18.  $\angle ABC \cong \angle EDC$
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Example:



Given:  $\overline{AB} \cong \overline{EF}$ ,  $\overline{BC} \cong \overline{FD}$ ,  $\overline{BC} \parallel \overline{FD}$ ,  $m\angle ACB = 90^\circ$

Prove:  $\triangle ACB \cong \triangle FDE$

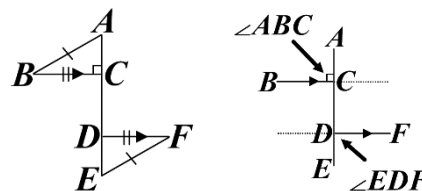
Statements	Reasons
1. $\overline{AB} \cong \overline{EF}$ , $\overline{BC} \cong \overline{FD}$ , $\overline{BC} \parallel \overline{FD}$ , $m\angle ACB = 90^\circ$	1. Given
2. $\angle EDF \cong \angle ACB$	2. _____
3. $m\angle EDF = m\angle ACB$	3. Definition of Congruence
4. $m\angle EDF = 90^\circ$	4. Substitution
5. $\triangle ACB \cong \triangle FDE$	5. _____

a. Reason #2 is

b. Reason #5 is

**Answer: a. Alternate Exterior Angles; b. HL**

Reason #2 wants an explanation for why  $\angle EDF \cong \angle ACB$ . To find it, we must first look at those two angles in terms of the parallel lines.



$\angle EDF$  &  $\angle ACB$  are both outside of the two parallel lines, making them EXTERIOR, and on different sides of the transversal, making them ALTERNATE.

$\angle EDF \cong \angle ACB$  is true because of the **Alt. Ext.  $\angle$ s Thm.**

Reason #5 wants an explanation for why  $\triangle ACB \cong \triangle FDE$ .

There are only 5 options:

- SSS, if all 3 sides are congruent;
- SAS, if 2 sides and the connecting angle are congruent;
- HL, if 2 sides & the right angle not connecting are congruent;
- ASA, if 2 angles and the connecting side are congruent;
- and
- AAS, if 2 angles and the non-connecting side are congruent.

The proof gives us 3 pairs (2 side and 1 angle pairs), which narrows our choices to SAS or HL:

$$\overline{AB} \cong \overline{EF}, \overline{BC} \cong \overline{FD} \text{ \& } \angle EDF \cong \angle ACB$$

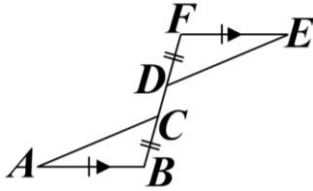
or, more simply:

$$\overline{AB} \cong \overline{EF}, \overline{BC} \cong \overline{FD} \text{ \& } \angle C \cong \angle E$$

The angle only connects to (shares a letter with) one side, so it does not connect them. This will be HL, because the non-connecting angle is right.

$\triangle ACB \cong \triangle FDE$  is true because of **HL.**

19.



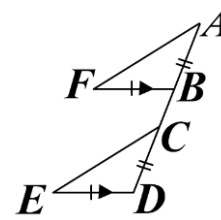
Given:  $\overline{AB} \cong \overline{FE}$ ,  $\overline{BC} \cong \overline{FD}$ ,  $\overline{AB} \parallel \overline{FE}$   
 Prove:  $\triangle ABC \cong \triangle FED$

Statements	Reasons
1. $\overline{AB} \cong \overline{FE}$ , $\overline{BC} \cong \overline{FD}$ , $\overline{AB} \parallel \overline{FE}$	1. Given
2. $\angle B \cong \angle F$	2. _____
3. $\triangle ABC \cong \triangle FED$	3. _____

a. Reason #2 is

b. Reason #3 is

20.



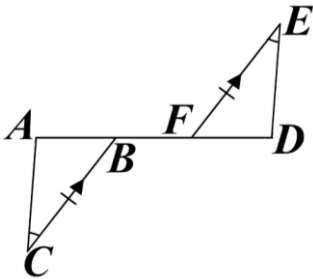
Given:  $\overline{AB} \cong \overline{CD}$ ,  $\overline{BF} \cong \overline{DE}$ ,  $\overline{BF} \parallel \overline{DE}$   
 Prove:  $\triangle ABF \cong \triangle CDE$

Statements	Reasons
1. $\overline{AB} \cong \overline{CD}$ , $\overline{BF} \cong \overline{DE}$ , $\overline{BF} \parallel \overline{DE}$	1. Given
2. $\angle ABF \cong \angle CDE$	2. _____
3. $\triangle ABF \cong \triangle CDE$	3. _____

a. Reason #2 is

b. Reason #3 is

21.



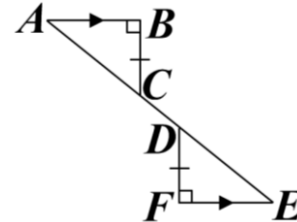
Given:  $\overline{BC} \cong \overline{FE}$ ,  $\angle C \cong \angle E$ ,  $\overline{BC} \parallel \overline{FE}$   
 Prove:  $\triangle ABC \cong \triangle FED$

Statements	Reasons
1. $\overline{BC} \cong \overline{FE}$ , $\angle C \cong \angle E$ , $\overline{BC} \parallel \overline{FE}$	1. Given
2. $\angle ABC \cong \angle FED$	2. _____
3. $\triangle ABC \cong \triangle FED$	3. _____

a. Reason #2 is

b. Reason #3 is

22.



Given:  $\overline{BC} \cong \overline{FD}$ ,  $m\angle B = 90^\circ$ ,  $m\angle F = 90^\circ$ ,  $\overline{AB} \parallel \overline{FE}$   
 Prove:  $\triangle ABC \cong \triangle FED$

Statements	Reasons
1. $\overline{BC} \cong \overline{FD}$ , $m\angle B = 90^\circ$ , $m\angle F = 90^\circ$ , $\overline{AB} \parallel \overline{FE}$	1. Given
2. $\angle BAC \cong \angle FED$	2. _____
3. $m\angle B = m\angle F$	3. Substitution
4. $\angle B \cong \angle F$	4. Definition of Congruence
5. $\triangle ABC \cong \triangle FED$	5. _____

a. Reason #2 is

b. Reason #5 is

**Semester 2 Final Review J**  
**Proving Triangles Congruent Answers:**

1. ASA	2. SSS	3. HL	4. AAS	5. SAS
6. B	7. A	8. B	9. B	
10. AAS	11. SAS	12. ASA	13. HL	14. SSS
15. Alt. Ext. $\angle$ s Thm.	16. Corr. $\angle$ s Post.	17. Same Side Int. $\angle$ s Thm.	18. Alt. Int. $\angle$ s Thm.	
19. a. Alt. Int. $\angle$ s Thm. b. SAS	20. a. Corr. $\angle$ s Post. b. SAS	21. a. Alt. Ext. $\angle$ s Thm. b. ASA	22. a. Alt. Int. $\angle$ s Thm. b. AAS	