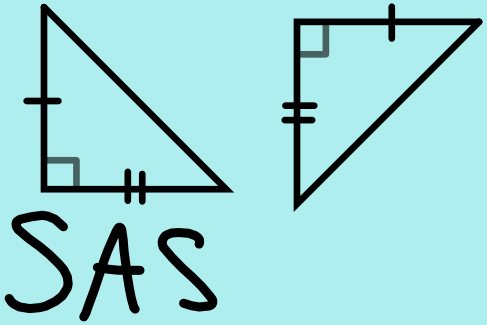
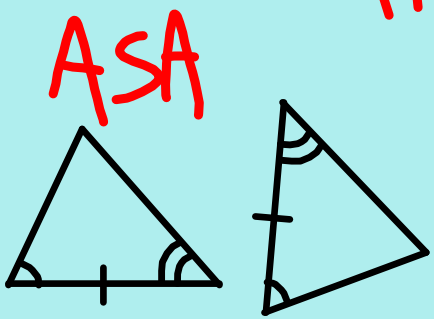
10/31/19 - Warm Up Problem

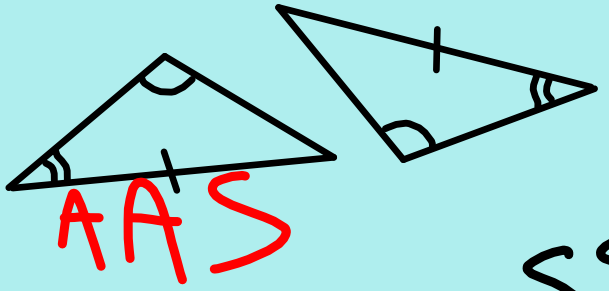
Which shortcut postulate or theorem proves each pair of triangles is congruent?



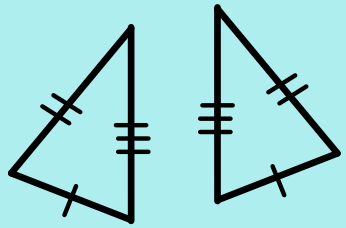
SAS



ASA



AAS



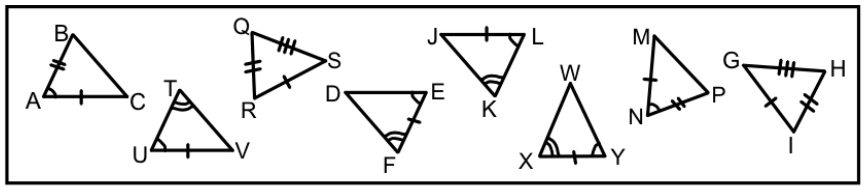
SSS

Concept 10 Worksheet

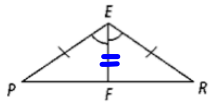
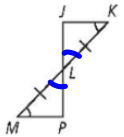
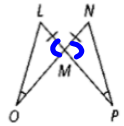
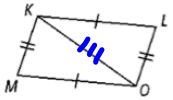
Choose two triangles from the box below to correctly fill in each congruence statement.

1. _____ ≅ _____ by SSS **2.** _____ ≅ _____ by SAS

3. _____ ≅ _____ by ASA **4.** _____ ≅ _____ by AAS



Complete the table below. In the "Given" column list the sides and angles on each diagram that are already marked congruent. In the "New Statements & Reasons" column find one more pair of angles or sides that are not currently marked congruent and say why they must be congruent. In the last column, state the postulate or theorem that proves the two triangles are congruent.

Diagram	Given	New Statements & Reasons	Why are they congruent?
5. 		$\overline{EF} \cong \overline{EF}$	SAS
6. 			ASA
7. 		$\angle LMO \cong \angle NMP$ Vertical	AAS
8. 			SSS

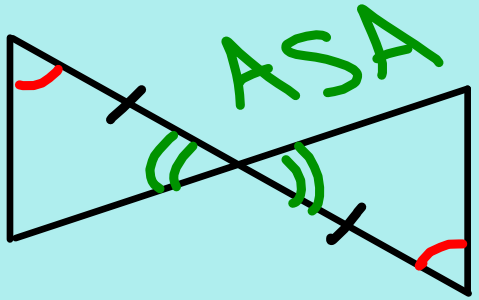
Section 4.6 - Congruence in Right Triangles

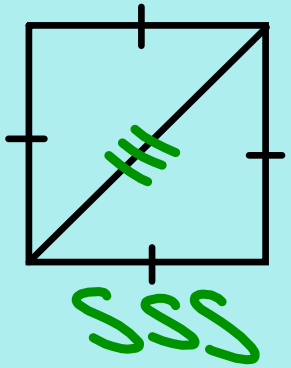
Goals: Use the HL Theorem to prove triangles are congruent and write proofs for triangle congruence and discuss methods that don't work

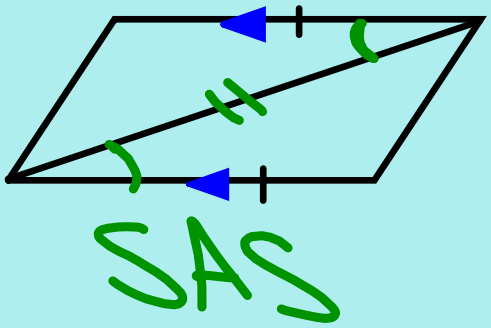
Remember: Not all congruent parts will be marked on the diagram!

Things to look for:

- Vertical Angles
- Angles on Parallel Lines
- Sides that are shared







SSS

SAS

ASA

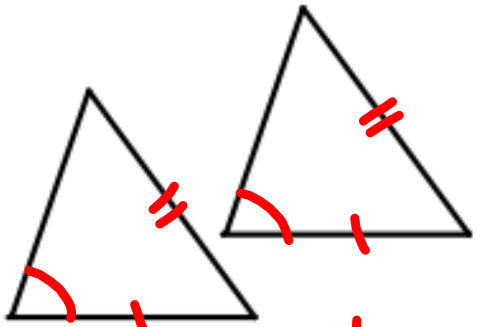
AAS

What combinations are we missing?

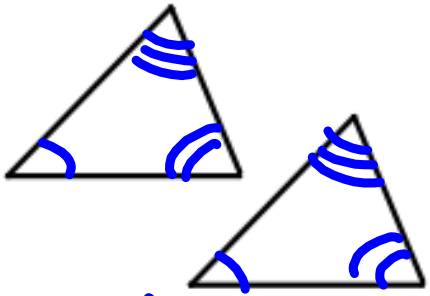
SSA AAA

THE BAD TRIANGLE PROOFS

- These two shortcuts have counterexamples and do not prove that triangles are congruent.



SSA / ASS

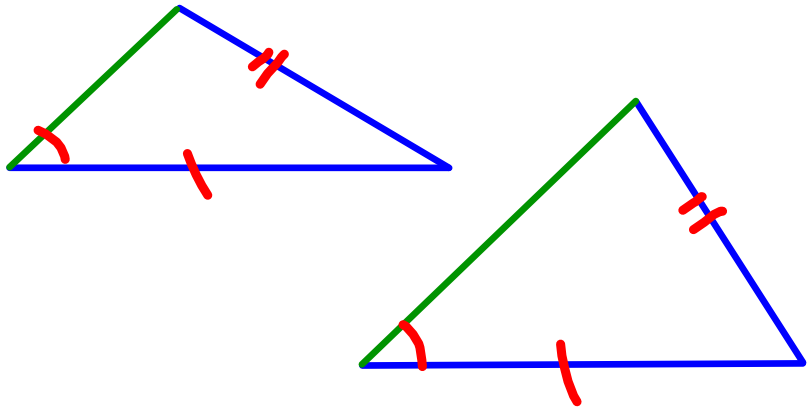


AAA

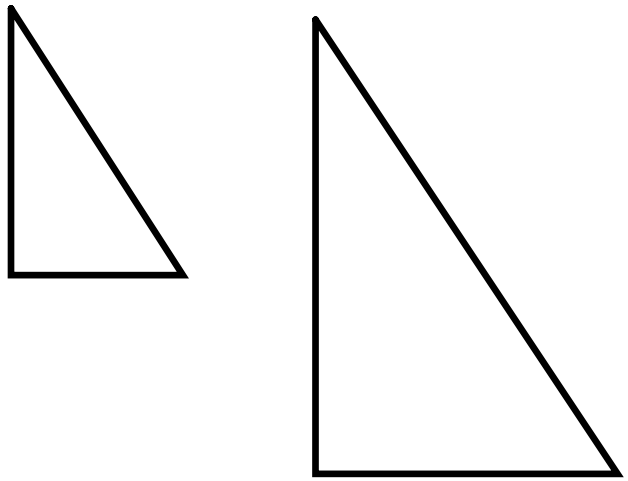
BAD PROOFS - these do not work

ASS - Angle, Side, Side

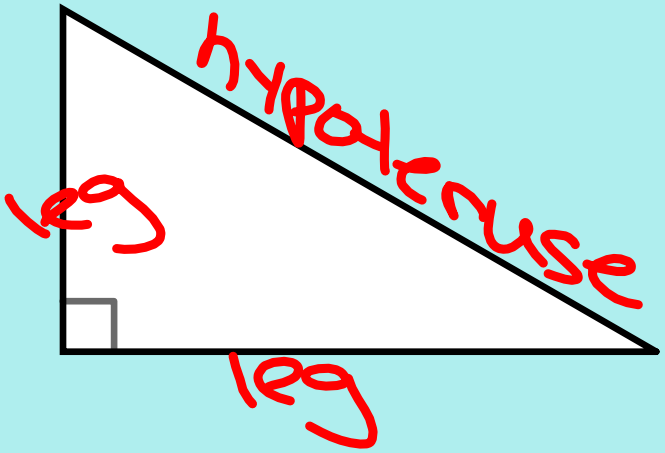
If it spells a bad word,
its a bad proof.



AAA - Angle, Angle, Angle



Parts of a Right Triangle

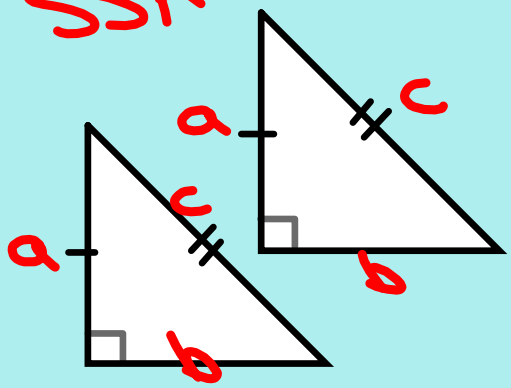


Legs: the sides of the triangle that form the right angle

Hypotenuse: the longest side of the triangle - opposite the right angle

Are these two right triangles congruent?

SSA

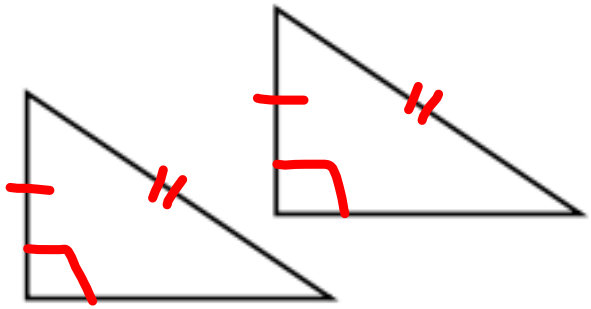


What is always true about the sides of a right triangle?

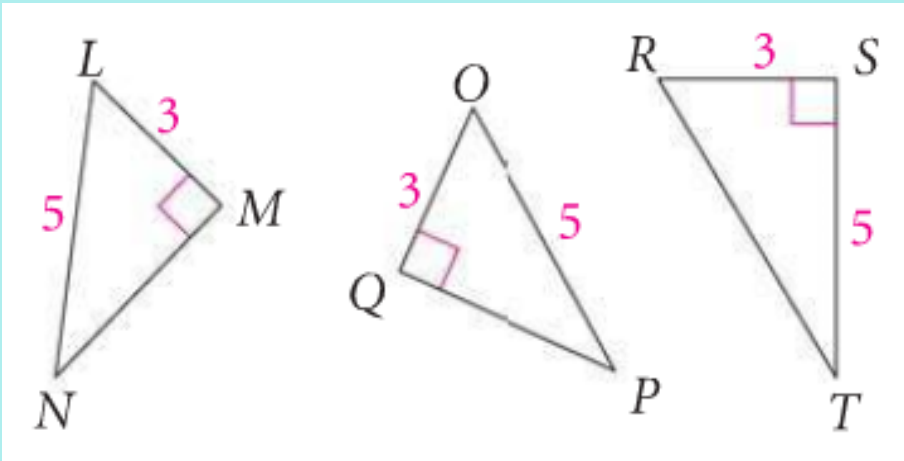
$a^2 + b^2 = c^2$

HYPOTENUSE-LEG THEOREM (HL)

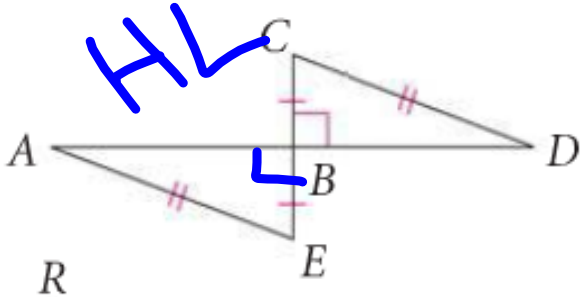
If the hypotenuse and leg of one right triangle is congruent to the hypotenuse and leg of another right triangle, then the triangles are congruent.



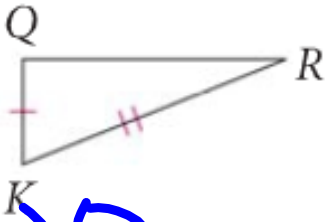
Which triangles are congruent by HL?



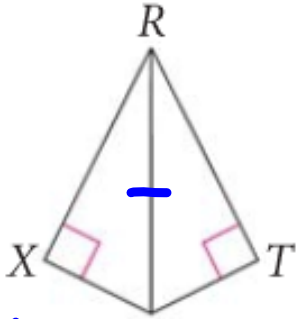
Can you prove each set of triangles is congruent by HL?



HL



NO



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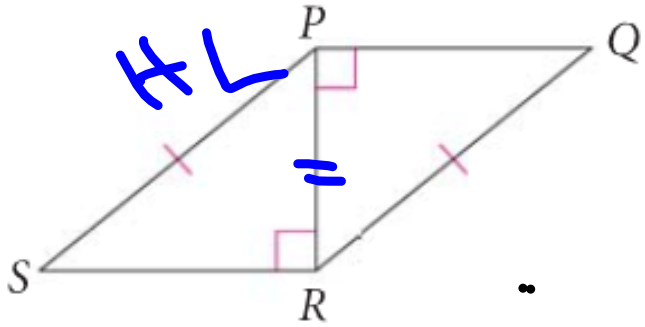
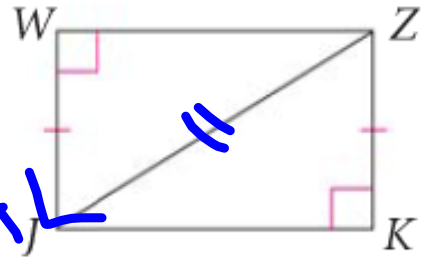


HL



HL

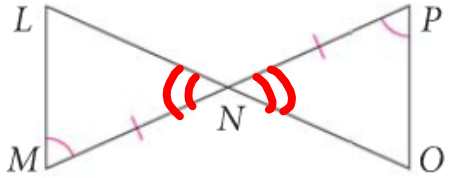
We get to do more proofs today!!!!!

WRITING PROOFS FOR CONGRUENT TRIANGLES

1. **GIVEN** – Write all given statements in your proof.
2. **DEFINITIONS** – If your given statements are sentences, change them to equations using definitions.
3. **THEOREMS/POSTULATES** – Look on your diagram for other angles that must be congruent especially **vertical angles** and angles on parallel lines like **corresponding** and **alternate interior**.
4. **REFLEXIVE PROPERTY** – Look for any sides or angles that both triangles share.
5. **CONGRUENCE STATEMENT** – End your proof with the triangle congruence statement justified with one of the triangle congruence shortcuts – **SSS, SAS, ASA, AAS, or HL**

Given: $\overline{NM} \cong \overline{NP}, \angle M \cong \angle P$

Prove: $\triangle NML \cong \triangle NPO$

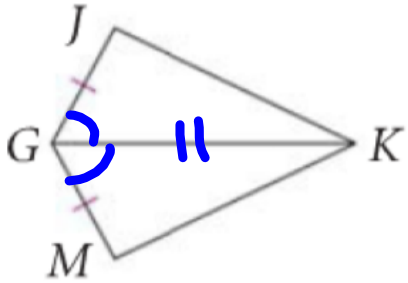


Statements	Justifications
1. $\overline{NM} \cong \overline{NP}$	GIVEN
2. $\angle M \cong \angle P$	
3. $\angle LNM \cong \angle PNO$	Vertical Angles Thm
4. $\triangle NML \cong \triangle NPO$	ASA

Writing Proofs for Triangle Congruence

Given: $\overline{GK}$ bisects $\angle JGM$, $\overline{GJ} \cong \overline{GM}$.

Prove: $\triangle GJK \cong \triangle GMK$



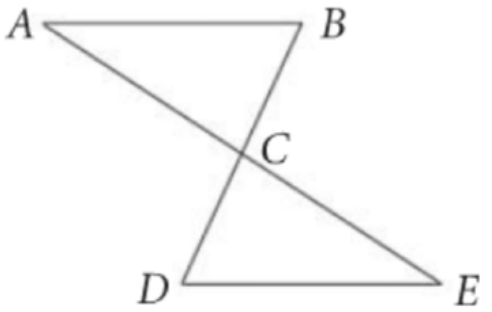
Statements	Justifications
1. $\overline{GK}$ bisects $\angle JGM$	GIVEN
2. $\overline{GJ} \cong \overline{GM}$	
3. $\angle JGK \cong \angle MGK$	Def. of Bisect
4. $\overline{GK} \cong \overline{GK}$	Reflexive Property
5. $\triangle GJK \cong \triangle GMK$	SAS

Discuss with your group...

What needs to be included in this proof?

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

Prove: $\Delta ACB \cong \Delta ECD$

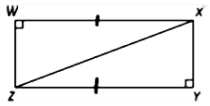


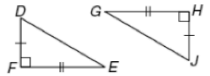
Statements	Justifications
1. C is the midpoint of $\overline{AE}$	Given
2. C is the midpoint of $\overline{BD}$	Given
3. $\overline{AC} \cong \overline{CE}$	Def. of Midpoint
4. $\overline{BC} \cong \overline{CD}$	Def. of Midpoint
5. $\angle ACB \cong \angle ECD$	Vertical Angles Theorem
6. $\Delta ACB \cong \Delta ECD$	SAS

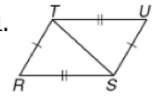
Assignment:

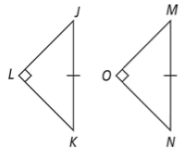
Concept 10 Worksheet - due Thursday 11/7
(#9-23)

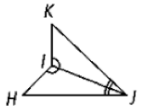
Determine why each pair of triangles is congruent: SSS, SAS, AAS, ASA, or HL. If the triangles cannot be proven congruent, write "not possible."

9. 

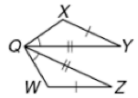
10. 

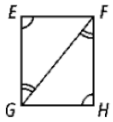
11. 

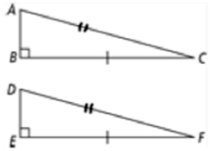
12. 

13. 

14. 

15. 

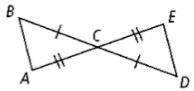
16. 

17. 

PROOFS USING SSS, SAS, ASA, AAS, AND HL

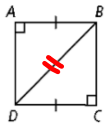
Complete each proof.

18. **Given:** $\overline{BC} \cong \overline{DC}, \overline{AC} \cong \overline{EC}$
Prove: $\Delta ABC \cong \Delta EDC$



Statements	Justifications
1.	
2.	
3.	
4.	
5.	

19. **Given:** ∠A and ∠C are right angles and $\overline{AB} \cong \overline{DC}$
Prove: $\Delta ABD \cong \Delta CDB$



Statements	Justifications
1. ∠A and ∠C are right angles	GIVEN
2. $\overline{AB} \cong \overline{CD}$	
3. $\overline{BD} \cong \overline{BD}$	Reflexive Prop.
4. $\Delta ABD \cong \Delta CDB$	HL
5.	