Name: _____

Write your questions here!

5.1 Triangle Congruence Postulates

Congruent Figures: Figures that are the same shape and size.

- *All corresponding angles are congruent*
- *All corresponding sides are congruent*

How are congruent figures different from similar figures? How are they the same?

_____

_____

_____

CPCTC: "All corresponding parts of congruent figures are congruent"

Intro Activity: (AngLegs)

Lawrence the Laborer Story

Lawrence works for a company that makes roof trusses, triangular pieces that support simple roofs. His job is to ensure that each and every roof truss that is made at the company is exactly the same size as all the others.

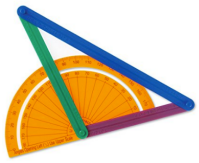
Version A: Because Lawrence is so lazy and likes to avoid as much work as possible, he wants to find the easiest way possible to do his job.

Version B: Because Lawrence is ~~so lazy~~ a no-nonsense person and likes to avoid as much unnecessary work as possible, he wants to find the ~~easiest~~ most efficient way possible to do his job.

How do you think his boss should view Lawrence?

_____

_____



Help Lawrence find the ~~easiest~~ most productive way to show that two triangular trusses are equal in measure with as little ~~work~~ wasted time as possible.

To do this test to see if the following 3-measurement shortcuts work, do they prove the two triangles are in fact congruent?

SIDE-SIDE-SIDE	**ANGLE-ANGLE**
Δ ABC: Attach 1 purple to 1 red to 1 yellow. Δ DEF: Attach 1 red to 1 purple to 1 yellow.	Δ ABC: Attach 3 blue sticks together. Δ DEF: Attach 3 purple sticks together. What is the degree of all the corresponding angles? _____
SIDE-ANGLE-SIDE	**ANGLE-SIDE-ANGLE**
Δ ABC: Attach a yellow stick to a 95° angle to a green stick. (Angle in middle) Δ DEF: Attach a green stick to a 95° angle to a yellow stick. (Angle in middle)	Δ ABC: Attach a _____° angle to red stick to a _____° angle. (Side in middle) Δ DEF: Attach a _____° angle to red stick to a _____° angle. (Side in middle)
ANGLE-SIDE-SIDE	**HYPOTENUSE-LEG**
Δ ABC: Draw a 30° angle. Attach the 30° angle to a blue stick to a purple stick. (Blue side in middle) Δ DEF: Draw a 30° angle. Attach the 30° angle to a blue stick to a purple stick. (Blue side in middle)	Δ ABC: Attach a 90° angle to a purple stick to a blue stick Δ DEF: Attach a 90° angle to a purple stick to a blue stick
ANGLE-ANGLE-SIDE	
Δ ABC: 35° angle (Draw this out on a sheet of paper), 110° angle, & 1 yellow stick Δ DEF: 35° angle (Draw this out on a sheet of paper), 110° angle, & 1 yellow stick	

Write your questions here!

Video 1:

What is the purpose of this lesson?

To prove that two triangles are congruent using relationships between corresponding angles and sides between the two triangles.

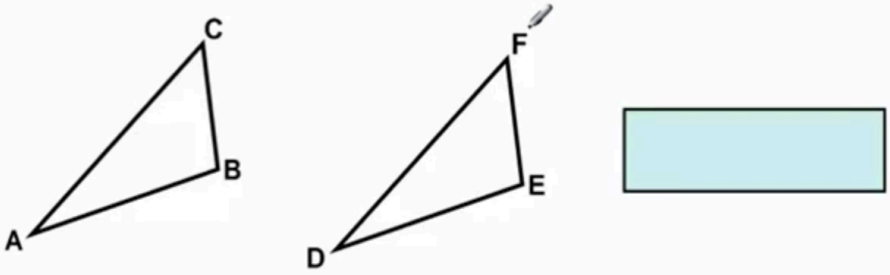
You must have a combination of _____ corresponding angles and side to prove two triangles are congruent.

5 Triangle Congruence Postulates

- Side-Side-Side (SSS)
- Side-Angle-Side (SAS)
- Angle-Side-Angle (ASA)
- Angle-Angle-Side (AAS)
- HL (Hypotenuse-Leg)
  otherwise known as RHS (Right-angle-Hypotenuse-Side)

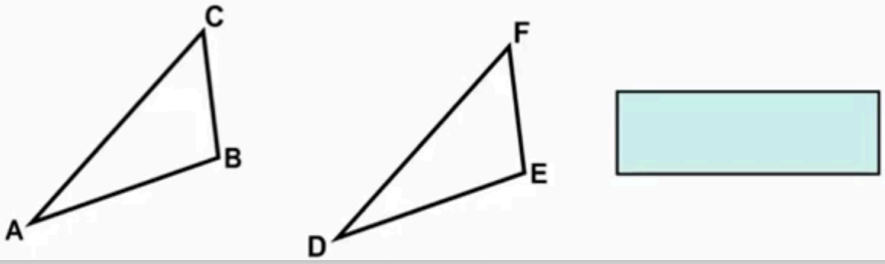
Side-Side-Side (SSS) Postulate

If the sides of one triangles are congruent to the sides of another triangle, then the two triangles are congruent by the SSS postulate.



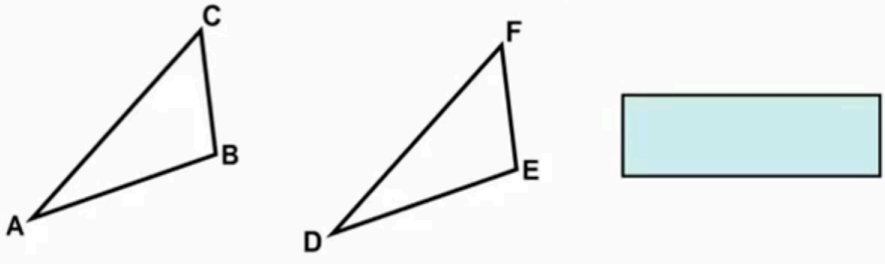
Side-Angle-Side (SAS) Postulate

If two sides and the included angle of one triangle are congruent to two sides and the included angle of another triangle, then the two triangles are congruent by the SAS postulate.



Angle-Side-Angle (ASA) Postulate

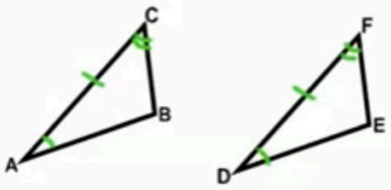
If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the two triangles are congruent by the ASA postulate.



Write your questions here!

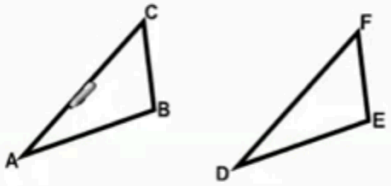
ASA versus AAS Postulates

Angle-Side-Angle(ASA)



$\Delta ABC \cong \Delta DEF$
by ASA Postulate

Angle-Angle-Side(AAS)

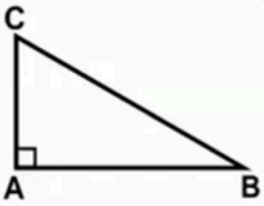


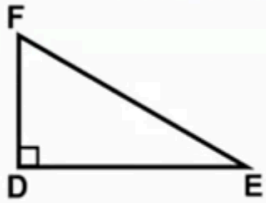
$\Delta ABC \cong \Delta DEF$
by AAS Postulate

Hypotenuse-Leg(HL) or Right-angle-Hypotenuse-Side(RHS) Postulate

If two right triangles have congruent hypotenuses and congruent corresponding sides, then the two triangles are congruent by the HL or RHS postulate.

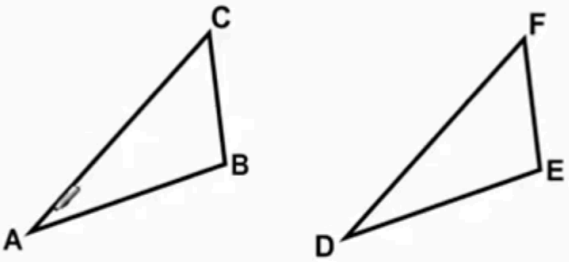
ONLY FOR RIGHT TRIANGLES!!!





Angle-Angle-Angle (AAA) Postulate

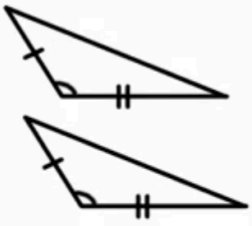
You can't prove two triangles are congruent to each other if you only compare their angle relationships.



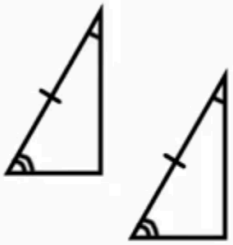
TRY ON YOUR OWN: Then check answers with video 1 and video 2

State whether these pairs of triangles are congruent by SSS, SAS, ASA, AAS, or HL postulates. If none of these methods work, write None. None indicates that the triangles aren't congruent.

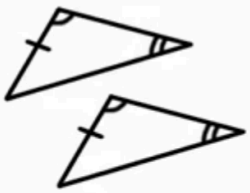
Ex. 1)



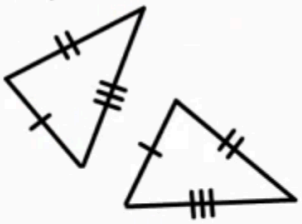
Ex. 2)



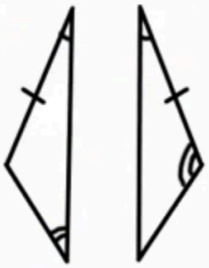
Ex. 3)



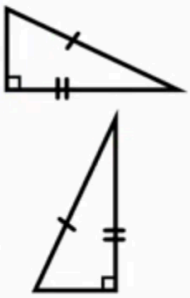
Ex. 4)



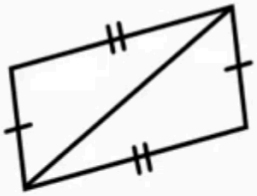
Ex. 5)



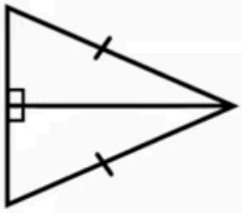
Ex. 6)



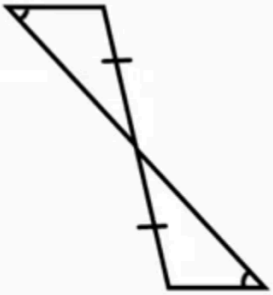
Ex. 7)



Ex. 8)

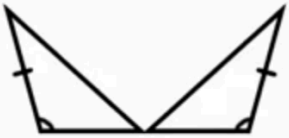


Ex. 9)

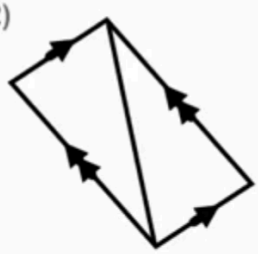


Ex. 10)

Ex. 11)

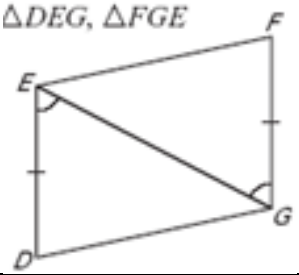


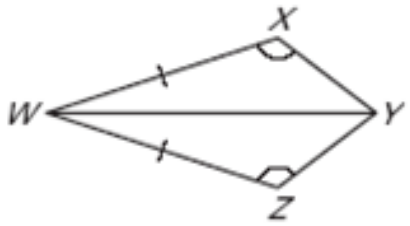
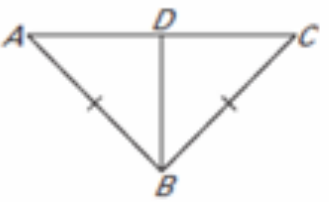
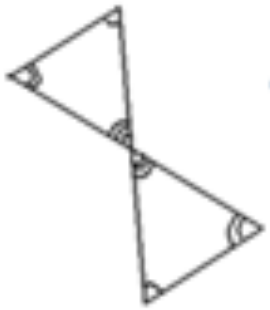
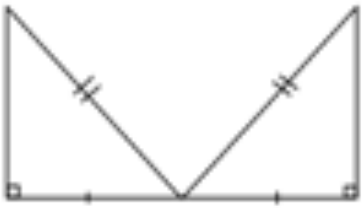
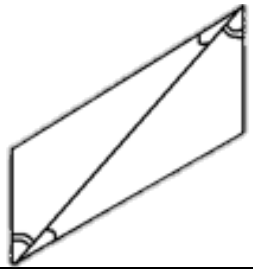
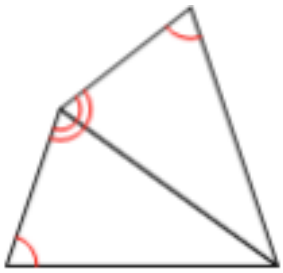
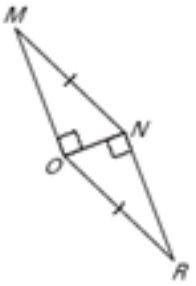
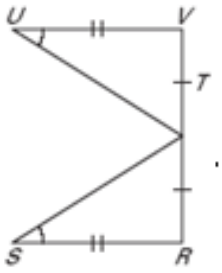
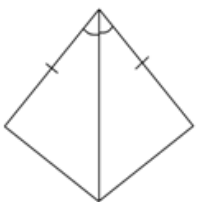
Ex. 12)

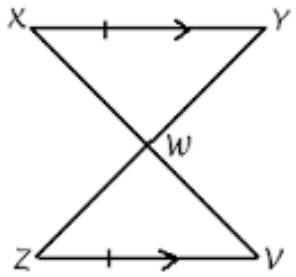
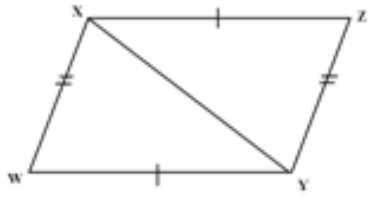
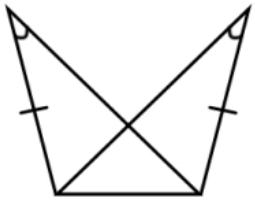
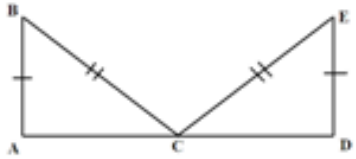
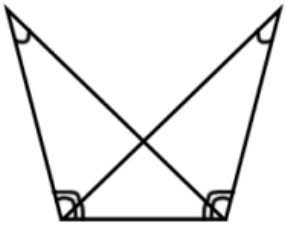


Now, summarize your notes here!

5.1 Problem Set

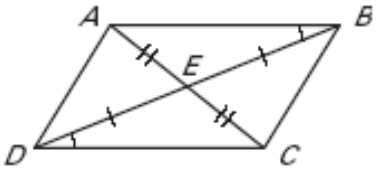
State if the two triangles are congruent. If they are, state why.	
1. 	2. $\triangle DEG, \triangle FGE$ 

3.  	4. 
5. **GIVEN:** D is the midpoint of $\overline{AC}$.  	6. 
7. 	8. 
9. 	10. 
11.  	12. 

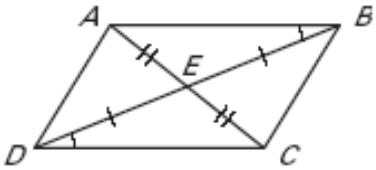
13. 	14. 
15. 	18. 
19. 	20. 
21. 	22. 

21. Explain how you can prove that the indicated triangles are congruent using the given postulate or theorem.

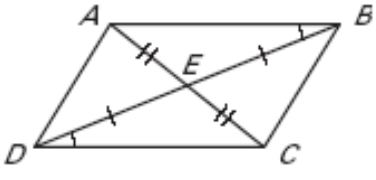
a. $\triangle ABE \cong \triangle CDE$ by SAS

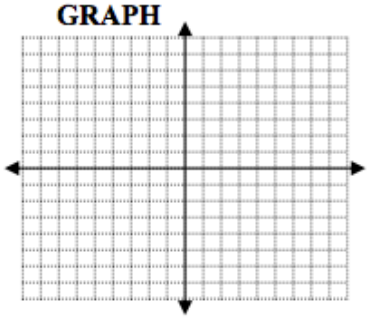
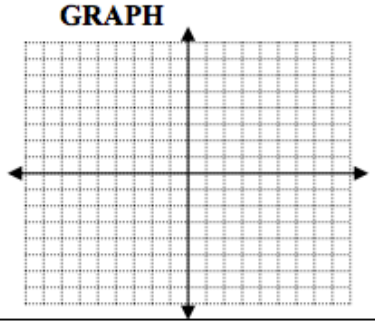


b. $\triangle ABE \cong \triangle CDE$ by ASA



c. $\triangle ABE \cong \triangle CDE$ by AAS

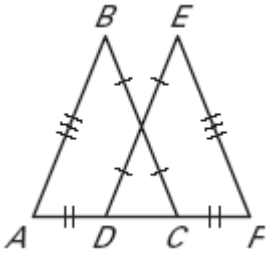


ALGEBRA REVIEW		
SOLVE $5-2(3x-4)=-7$	**GRAPH** $y=-x$ 	**MULTIPLY** $(5x-3)(2x+3)$
SOLVE $\frac{2x-1}{6}=\frac{x}{4}$	**GRAPH** $y=\frac{2}{3}x$ 	**FACTOR** $x^2-10x-24$

ACT Application Problems

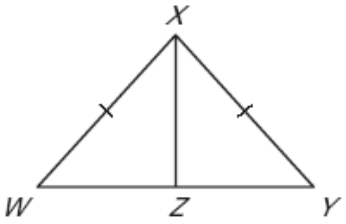
_____ 1. What postulate or theorem would you use to prove $\Delta ABC \cong \Delta FED$?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



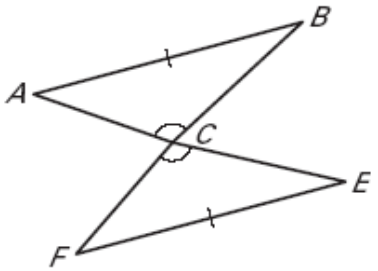
_____ 2. What information is needed to prove that $\Delta WXZ \cong \Delta YXZ$ by the SAS Congruence Postulate?

A. $\overline{WZ} \cong \overline{YZ}$
B. $\angle XWZ \cong \angle XYZ$
C. $\angle WXZ \cong \angle YXZ$
D. None of the above.



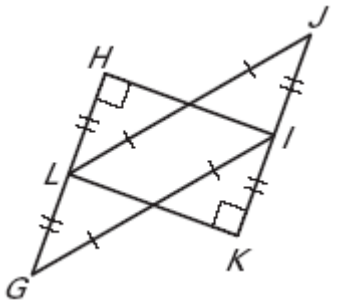
_____ 3. What postulate or theorem would you use to prove $\Delta ABC \cong \Delta FEC$?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



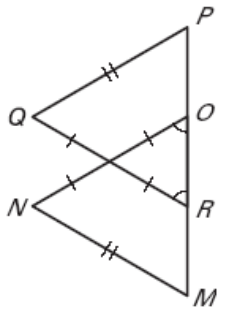
_____ 4. What postulate or theorem would you use to prove $\Delta GHI \cong \Delta JKL$

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



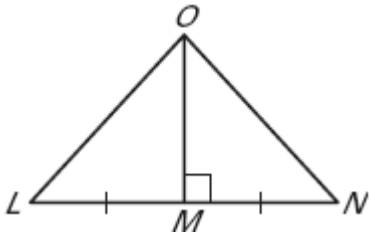
_____ 5. What postulate or theorem would you use to prove $\Delta MNO \cong \Delta PQR$

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



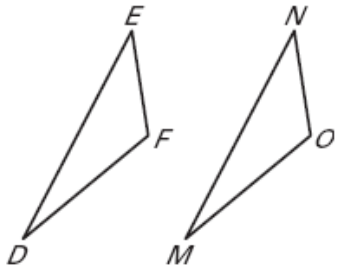
_____ 6. What postulate or theorem would you use to prove $\Delta OML \cong \Delta OMN$?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



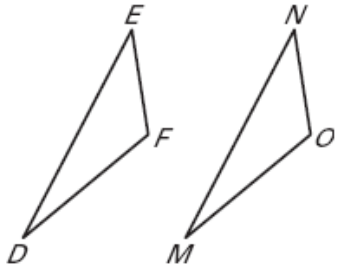
_____ 7. State the third congruence that is needed to prove that $\Delta DEF = \Delta MNO$ given that $\overline{DE} \cong \overline{MN}$ and $\angle M \cong \angle D$ using the SAS Congruence Postulate.

A. $\overline{DF} \cong \overline{MO}$
B. $\angle E \cong \angle N$
C. $\overline{EF} \cong \overline{NO}$
D. None of the above.



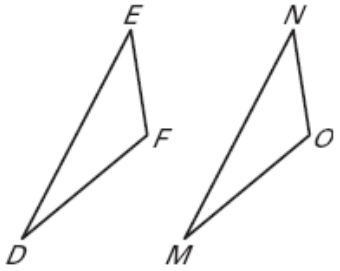
_____ 8. State the third congruence that is needed to prove that $\Delta DEF = \Delta MNO$ given that $\overline{FE} \cong \overline{ON}$ and $\angle F \cong \angle O$ using the AAS Congruence Theorem.

A. $\angle D \cong \angle M$
B. $\overline{DF} \cong \overline{MO}$
C. $\angle E \cong \angle N$
D. None of the above.



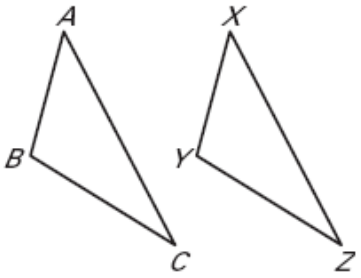
_____ 9. State the third congruence that is needed to prove that $\Delta DEF = \Delta MNO$ given that $\overline{FE} \cong \overline{ON}$ and $\angle F \cong \angle O$ using the ASA Congruence Postulate.

A. $\angle D \cong \angle M$
B. $\overline{DF} \cong \overline{MO}$
C. $\angle E \cong \angle N$
D. None of the above.



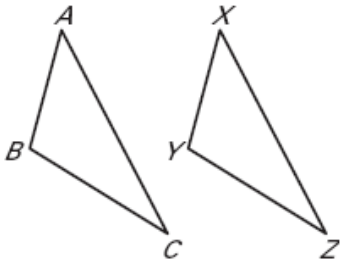
_____ 10. Which of these statements could NOT be the third congruence that is needed to prove that $\Delta ABC \cong \Delta XYZ$ given that $\angle A \cong \angle X$ and $\angle B \cong \angle Y$ using the AAS Congruence Postulate?

A. $\overline{BC} \cong \overline{YZ}$
B. $\overline{AB} \cong \overline{XY}$
C. $\overline{AC} \cong \overline{XZ}$
D. None of the above.



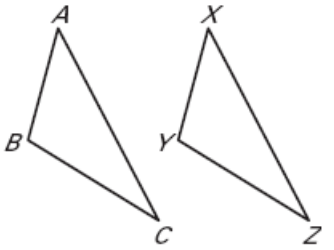
_____ 11. State the third congruence that is needed to prove that $\Delta ABC \cong \Delta XYZ$ given that $\angle A \cong \angle X$ and $\overline{AB} \cong \overline{XY}$ using the ASA Congruence Postulate.

A. $\angle C \cong \angle Z$
B. $\overline{AC} \cong \overline{XZ}$
C. $\angle B \cong \angle Y$
D. None of the above.



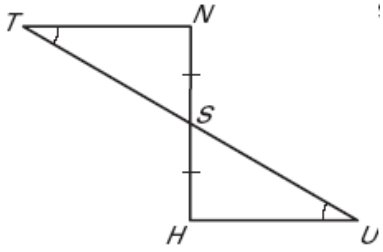
_____ 12. State the third congruence that is needed to prove that $\Delta ABC \cong \Delta XYZ$ given that $\overline{BC} \cong \overline{YZ}$ and $\angle C \cong \angle Z$ using the SAS Congruence Postulate.

A. $\overline{AC} \cong \overline{XZ}$
B. $\angle X \cong \angle A$
C. $\overline{AB} \cong \overline{XY}$
D. None of the above.



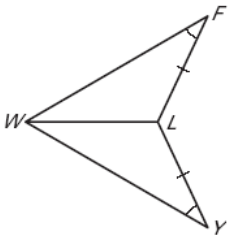
_____ 13. What theorem or postulate would you use to prove that the triangles are congruent?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



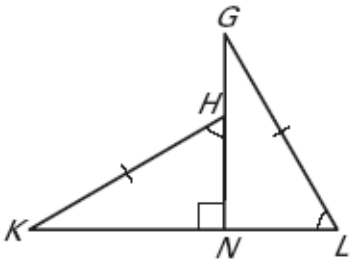
_____ 14. What theorem or postulate would you use to prove that the triangles are congruent?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



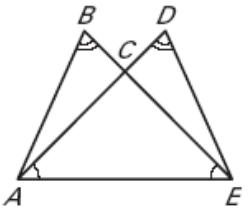
_____ 15. What theorem or postulate would you use to prove that the triangles are congruent?

A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



_____ 16. What theorem or postulate would you use to prove that the triangles are congruent?

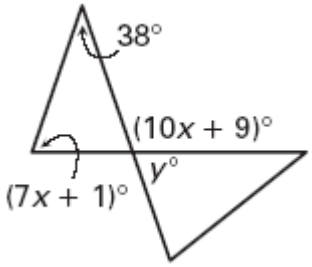
A. ASA
B. AAS
C. SAS
D. SSS
E. HL
F. None of the above.



FLASHBACK PROBLEMS:

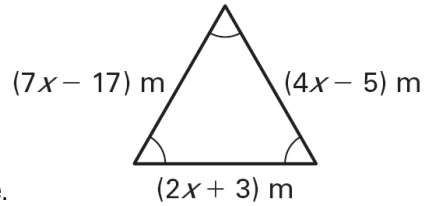
_____ 17. Find the value of $x + y$.

A. 10
B. 71
C. 81
D. 109
E. None of the above.



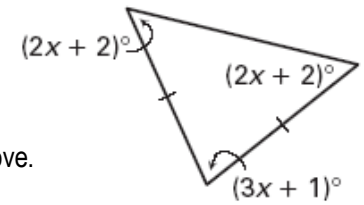
_____ 18. Find the length of a side.

A. 4
B. 11
C. 33
D. None of the above.



_____ 19. Find the measure of the vertex angle.

A. 25
B. 52
C. 76
D. None of the above.



_____ 20. Find the perimeter of the triangle.

A. 2
B. 6
C. 8
D. 28
E. None of the above.