H.Geometry – Chapter 4 – Definition Sheet

Section 4.1

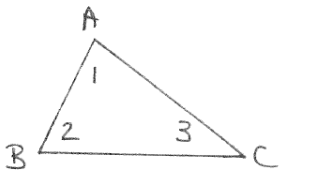
Triangle Sum Theorem	The sum of the measure of the angles in a triangle is _____

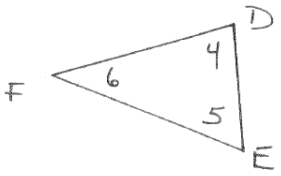
PROOF:

GIVEN: $m\angle 1 = m\angle 4$

$m\angle 2 = m\angle 5$

PROVE: $m\angle 3 = m\angle 6$





Conclusions	Justification

Third Angle Theorem	If two angles in one triangle are _____ to two angles in another triangle, then the _____ in each triangle are equal in measure to each other.

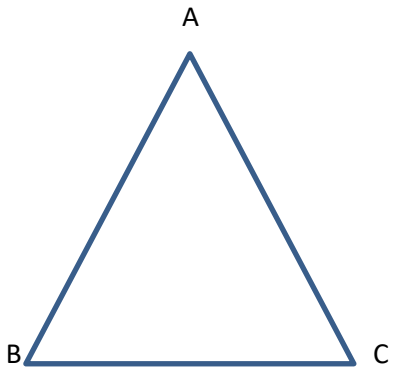
H.Geometry – Chapter 4 – Definition Sheet

Section 4.2

- Definition of Isosceles Triangle

A triangle with _____ two congruent sides.

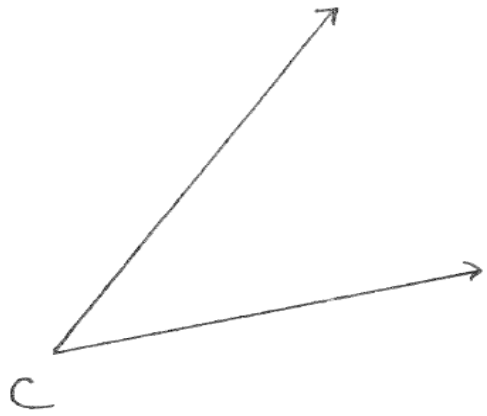
Parts:



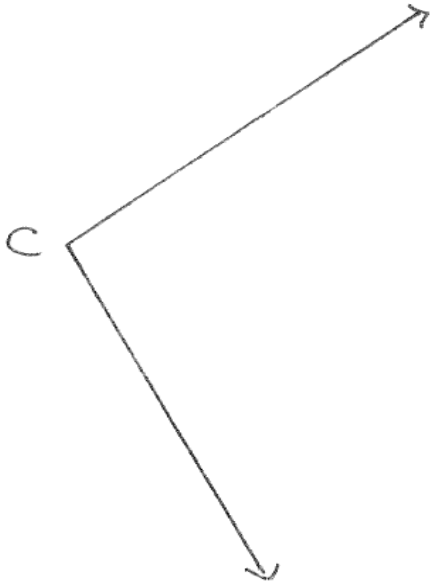
INVESTIGATION 1 (p. 207)

– CONSTRUCTING AN ISOSCELES TRIANGLE

* WITH AN ACUTE ∠



* WITH AN OBTUSE ∠



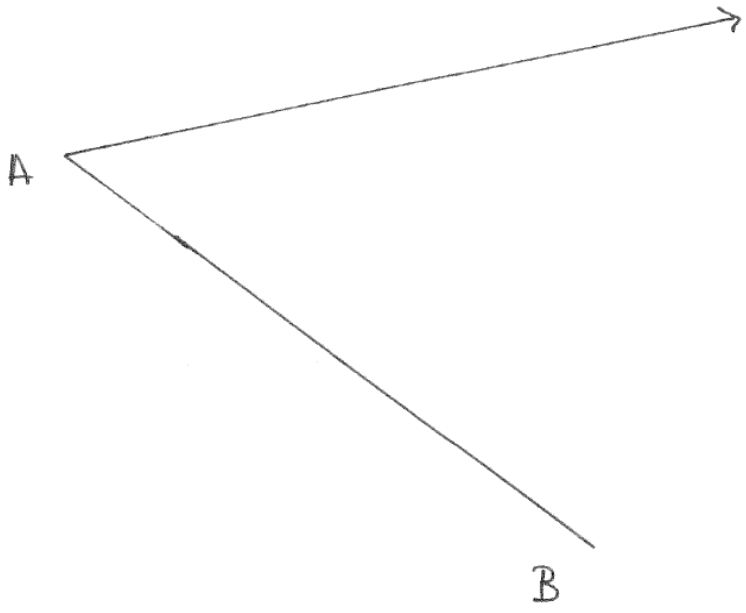
Measure out the base angles…. What do you notice?!?!

H.Geometry – Chapter 4 – Definition Sheet

Isosceles Triangle Theorem	If a triangle is _____, the its' _____ are congruent. 

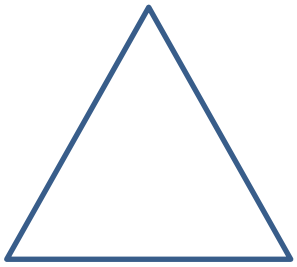
INUESTIGATION 2 (P.208)

- CONSTRUCTING A TRIANGLE WITH 2 $\cong$ $\angle$'S

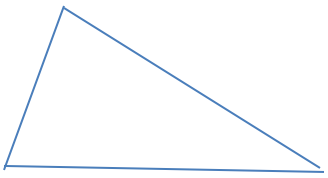


_____ **Converse Theorem**	If a triangle has _____, then it is an _____ 

H.Geometry – Chapter 4 – Definition Sheet

Application to Equilateral Triangles	If ΔABC is equilateral, is it equiangular? If ΔABC is equiangular, is it equilateral? 
Equilateral Triangle Theorem	(1) An equilateral triangle is equiangular (2) An equiangular triangle is equilateral

H.Geometry – Chapter 4 – Definition Sheet

Section 4.3	
Triangle Inequality Conjecture	The sum of the lengths of any two sides of a triangle is _____ than the length of the third side 

1. CAN A TRIANGLE BE MADE WITH THE GIVEN SIDES?

a) 3, 5, 7 ____

b) 8, 13, 25 ____

c) 10, 10, 10 ____

d) 15, 10, 5 ____

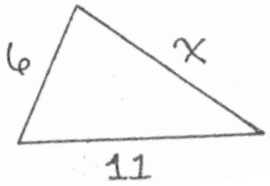
e) 16, 35, 13 ____

f) 11, 21, 31 ____

g) 8, 12, 22 ____

h) 1, 2, 3 ____

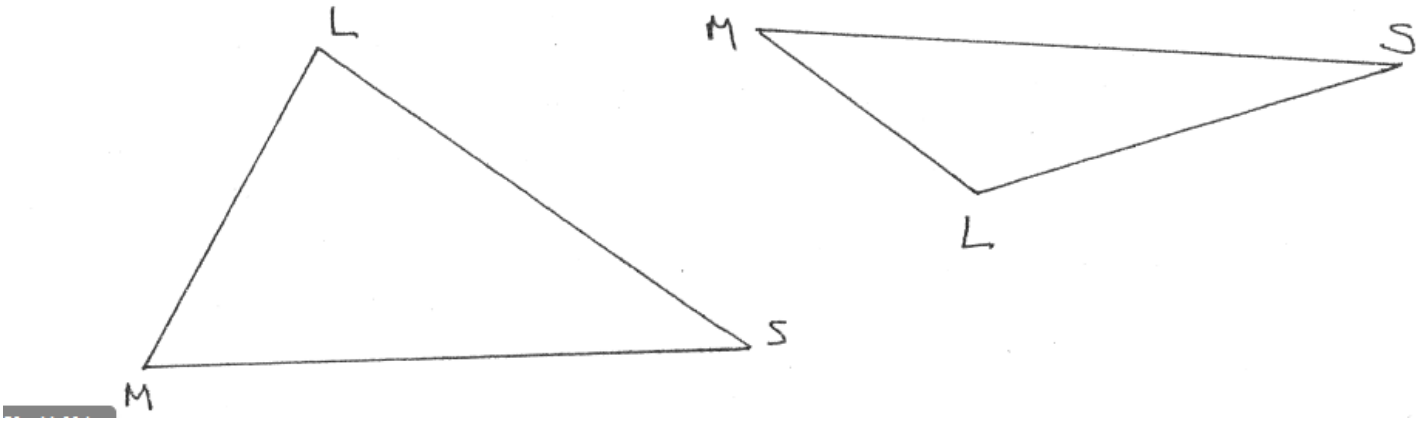
2. GIVE ALL THE POSSIBLE VALUES FOR X



____

H.Geometry – Chapter 4 – Definition Sheet

Relating sides and angles of a scalene triangle:
What do you notice between the relationship of the sides and angles?

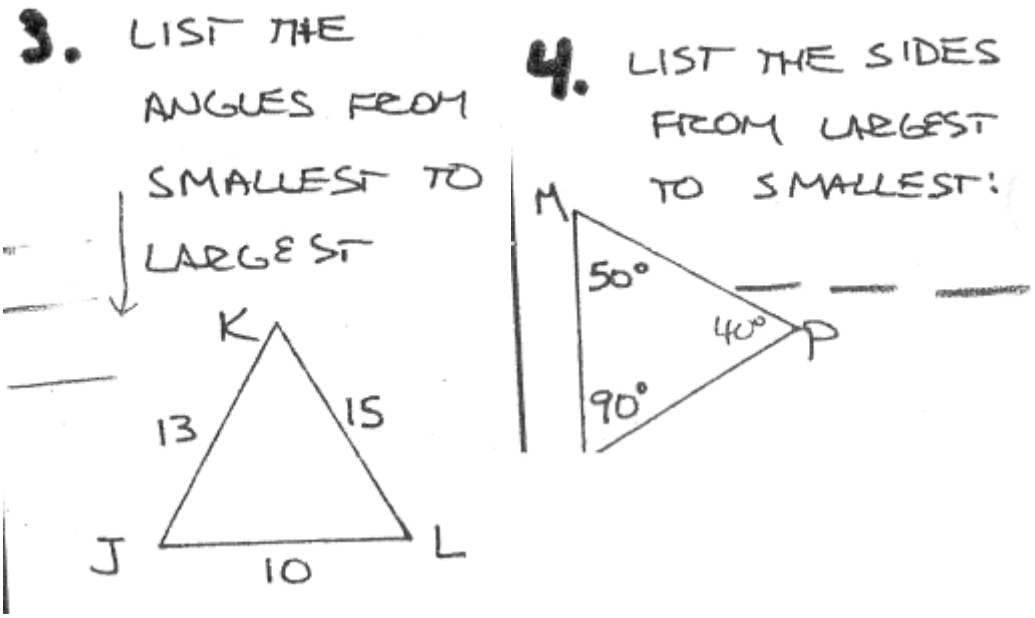


Side-Angle Inequality Conjecture

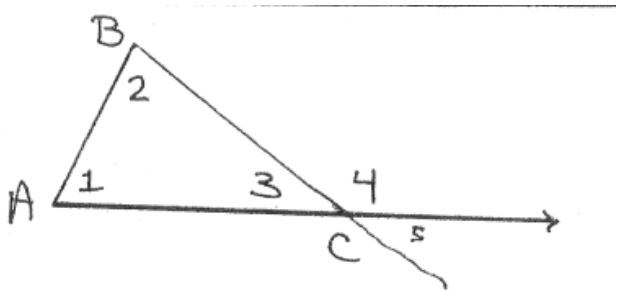
In a triangle

- The _____ side is opposite from the _____ angle.
- The _____ side is opposite from the _____ angle.

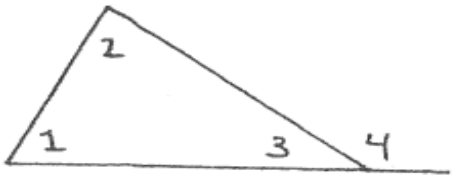
Example:



H.Geometry – Chapter 4 – Definition Sheet



_____ **Angle of a Triangle**	-Formed by extending one side from one of the vertices **EX: _____**
_____ **Interior Angle**	- The Interior Angle that forma a linear pair with an exterior angle **EX: _____**
_____ **Interior Angle**	- The two interior angles of a triangle NOT adjacent to the exterior angle **EX: _____**
Triangle Exterior Angle Theorem	- The measure of an exterior angle of a triangle is _____ _____ of the measures of the remote interior angles.



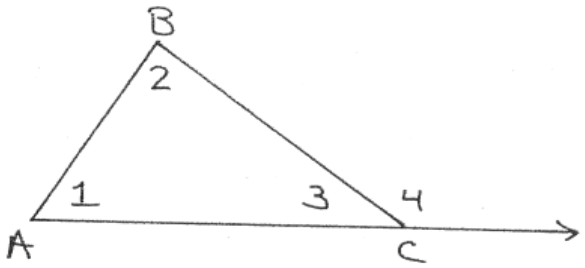
$m\angle 4 =$ _____

H.Geometry – Chapter 4 – Definition Sheet

Prove the Triangle Exterior Angle Theorem

PROOF:

GIVEN: $\triangle ABC$ WITH EXTERIOR $\angle 4$



PROVE: $m\angle 1 + m\angle 2 = m\angle 4$

CONCLUSIONS	JUSTIFICATIONS
0. $\triangle ABC$ WITH EXTERIOR $\angle 4$	0. GIVEN

H.Geometry – Chapter 4 – Definition Sheet

Section 4.4

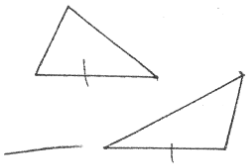
Congruent Triangles

- Would have to have 6 pairs of corresponding parts congruent
  3 pairs of sides and 3 pairs of angles

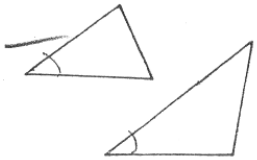
Determining if triangles are congruent with:

1 Pair of congruent corresponding parts

One side?

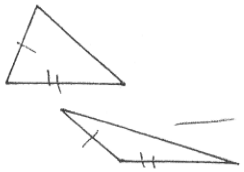


One Angle?

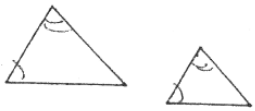


2 Pairs of congruent corresponding parts

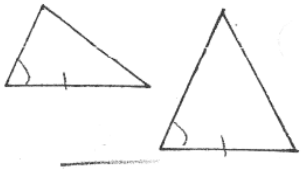
- Side – Side (SS)



- Angle-Angle (AA)

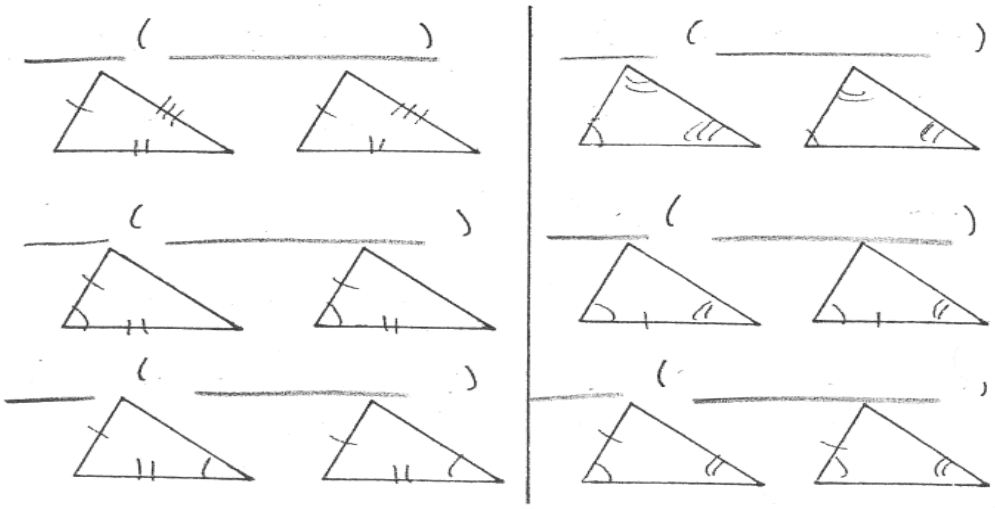


- Side-Angle (SA)



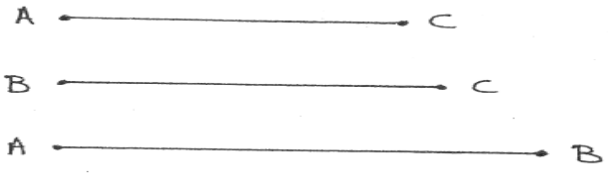
3 Pairs of congruent corresponding parts

- SIX POSSIBILITIES: (SOME WORK, SOME DON'T)

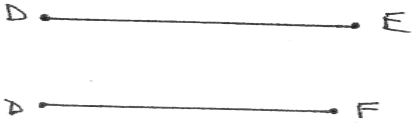


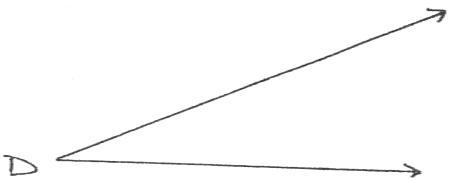
H.Geometry – Chapter 4 – Definition Sheet

INVESTIGATION 1 **SSS** CASE (P. 222)



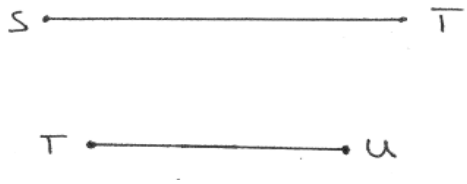
INVESTIGATION 2 **SAS** CASE (P. 223)



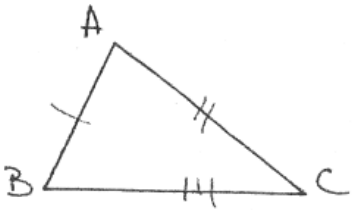


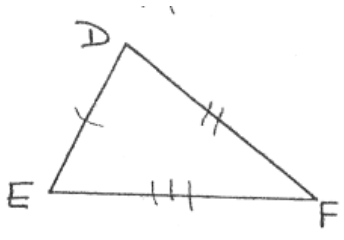
H.Geometry – Chapter 4 – Definition Sheet

INVESTIGATION 3 **SSA** CASE (P. 223)

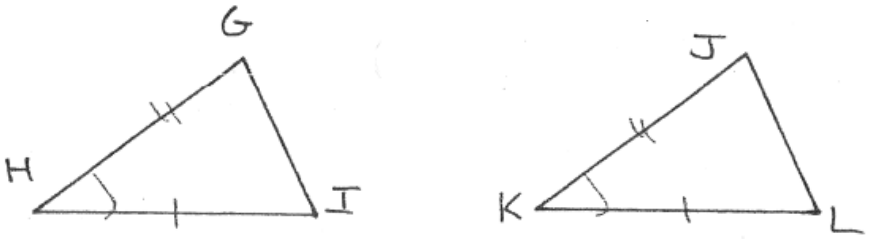
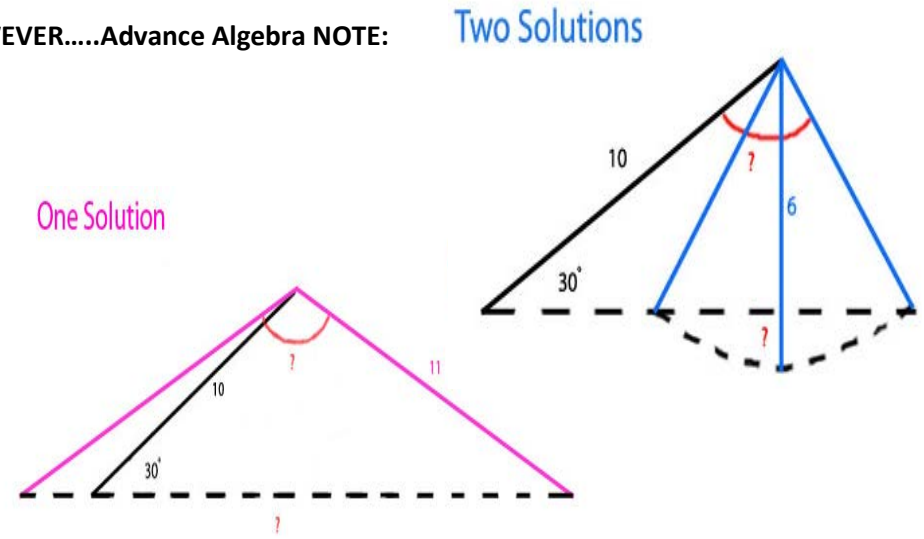
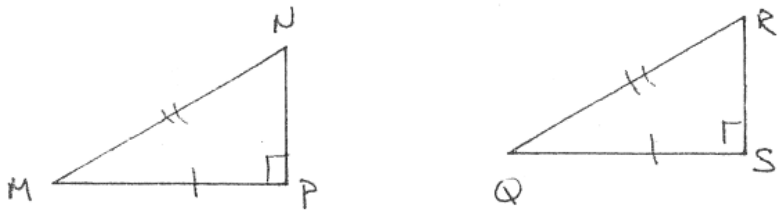


Congruence Conjecture (_____)	- If three sides of one triangle are congruent to the three sides of another triangle, then the triangles are congruent





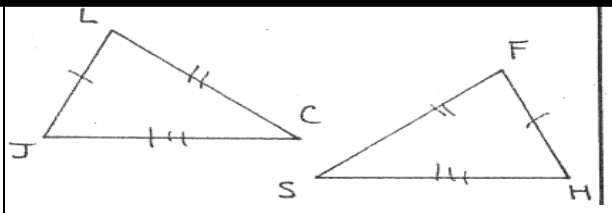
H.Geometry – Chapter 4 – Definition Sheet

Congruence Conjecture **(_____)**	- The two sides and their _____ angle in one triangle are congruent to two sides and their _____ angle in another triangle, then the triangles are congruent. 
_____	- Two sides and a non-included angle is not sufficient in determining if triangles are congruent. **HOWEVER…..Advance Algebra NOTE:** 
Congruence Conjecture **(_____)**	If the hypotenuse and one leg of a right triangle are congruent to the hypotenuse and one leg of another right triangle, then the triangles are congruent. 

H.Geometry – Chapter 4 – Definition Sheet

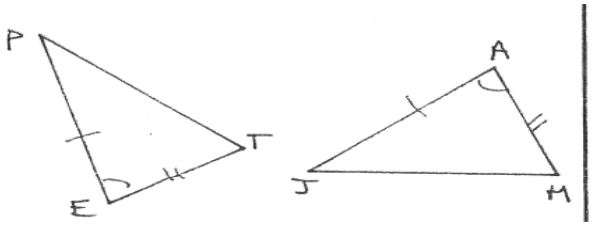
Section 4.5

SSS _____



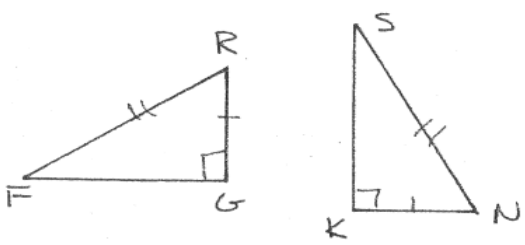
$\triangle LJC \cong$
$\triangle$ _____

SAS _____



$\triangle PET \cong$
$\triangle$ _____

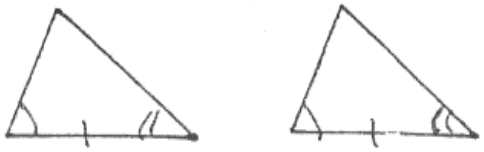
HL _____



$\triangle FRG \cong$
$\triangle$ _____

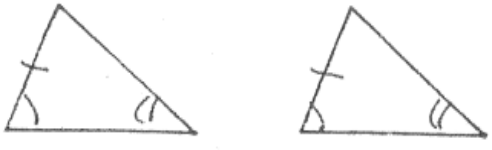
Remaining Cases:

ASA



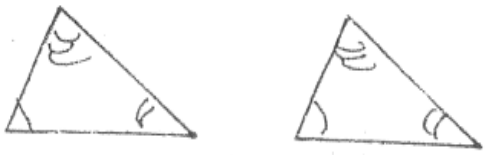
(INCLUDED SIDE)

SAA



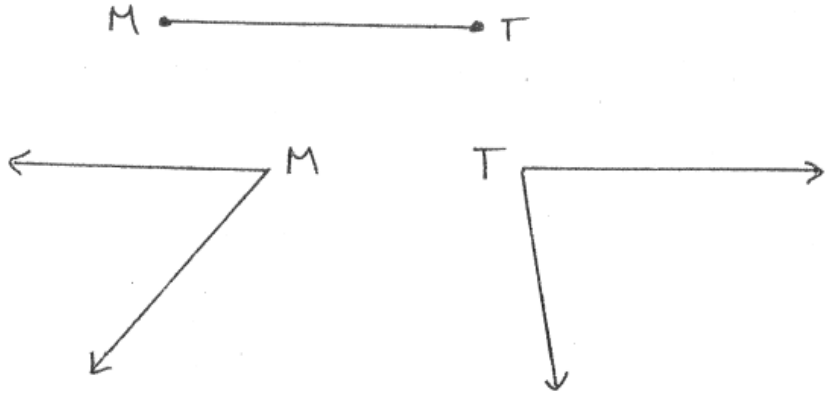
(NON-INCLUDED SIDE)

AAA



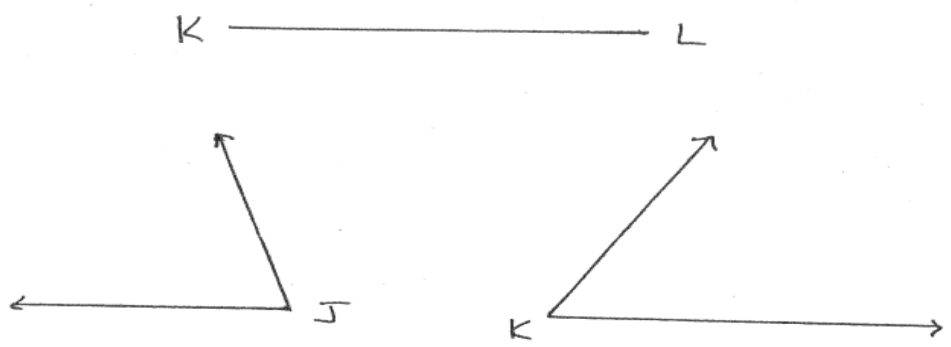
H.Geometry – Chapter 4 – Definition Sheet

INVESTIGATION 1 **ASA** CASE (P. 227)



H.Geometry – Chapter 4 – Definition Sheet

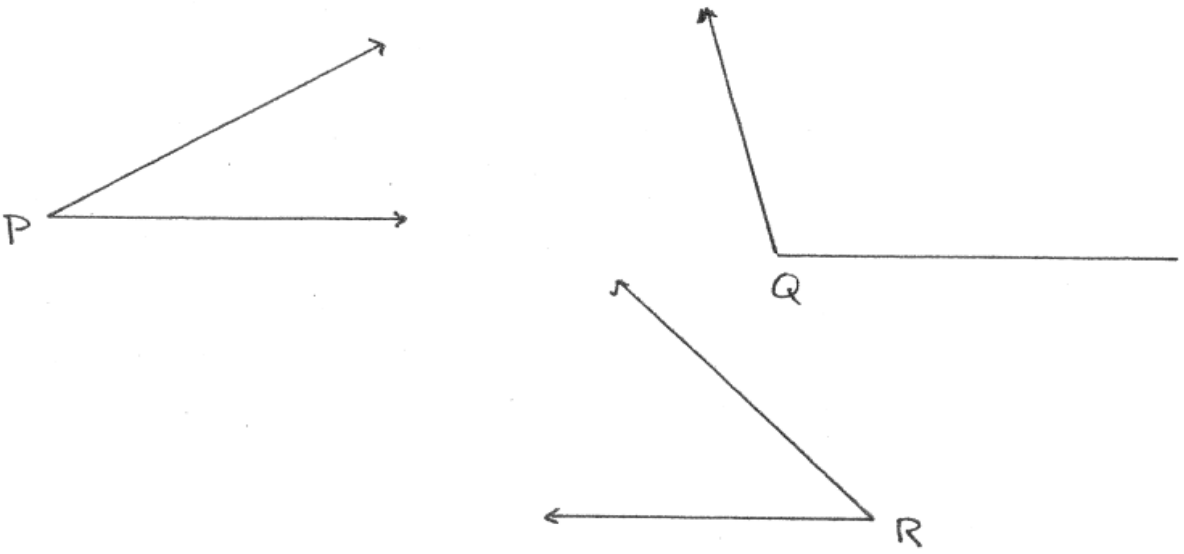
INVESTIGATION 2 **SAA** CASE (P. 228)



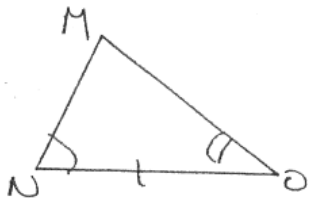
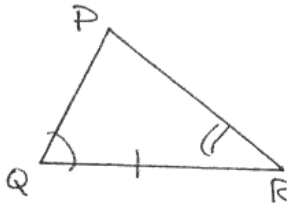
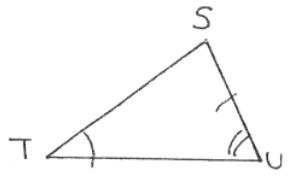
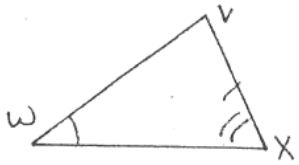
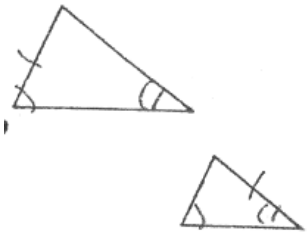
To construct angle L… form a straight line with J and K.

H.Geometry – Chapter 4 – Definition Sheet

INVESTIGATION 3 **AAA** CASE (P. 228)



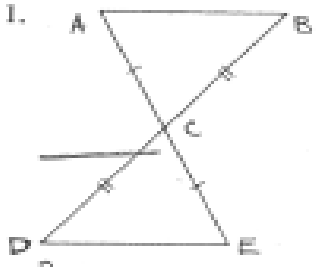
H.Geometry – Chapter 4 – Definition Sheet

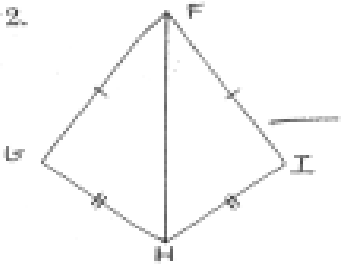
_____ **Congruence Conjecture** **(_____)**	If two angles and their included side in one triangle are congruent to two angles and its included side in another triangle, then the triangles are congruent.  
_____ **Congruence Conjecture** **(_____)(_____)**	If two angles and their _____ side in one triangle are congruent to two angles and their corresponding _____ side in another triangle, then the triangles are congruent.   Why are these not congruent??  Note: AAA Case – is not sufficient in determining if triangles are congruent.

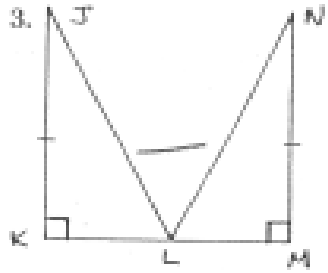
H.Geometry – Chapter 4 – Definition Sheet

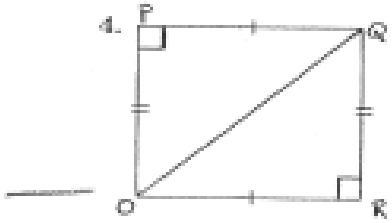
a) WRITE THE CONGRUENCE CONJECTURE (SSS, SAS, ASA, AAS) BY WHICH YOU CAN SAY THE TRIANGLES ARE CONGRUENT

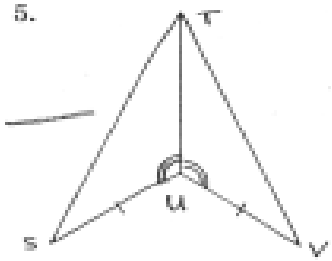
b) WRITE A CONGRUENCE STATEMENT FOR THE TRIANGLES (EX: $\triangle XYZ \cong \triangle RST$)

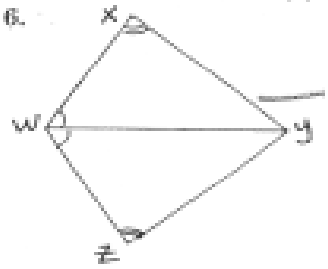
1. 

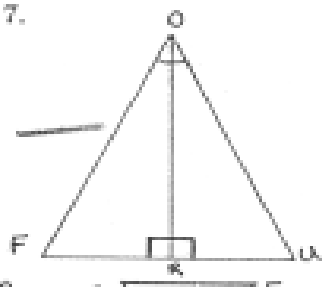
2. 

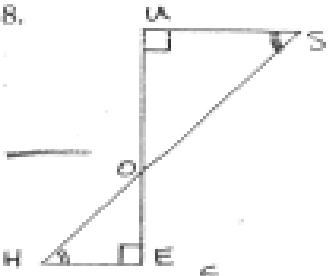
3. 

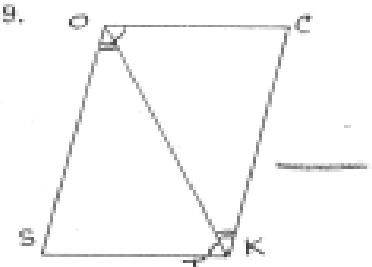
4. 

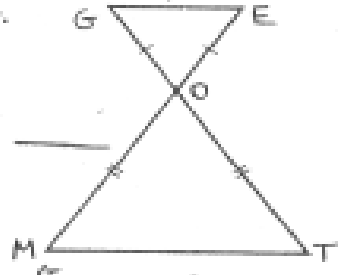
5. 

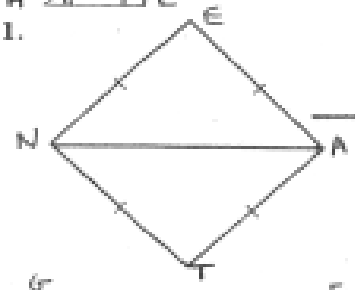
6. 

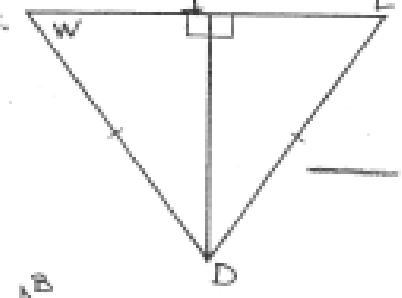
7. 

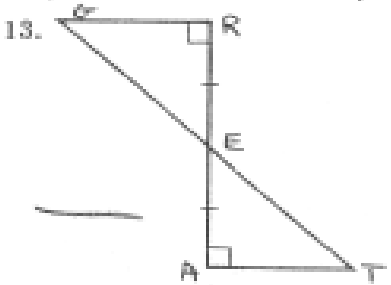
8. 

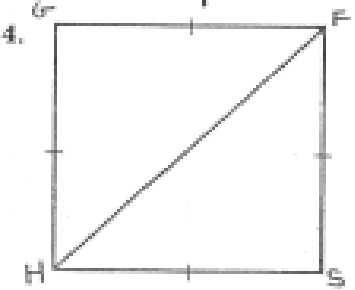
9. 

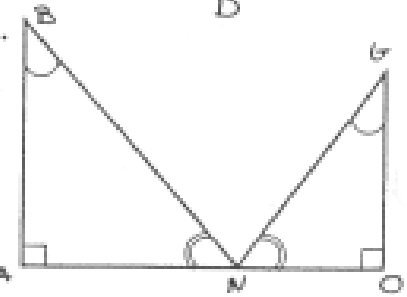
10. 

11. 

12. 

13. 

14. 

15. 

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Section 4.6

<u>Recall:</u> Triangle congruence shortcuts

_____, _____, _____, _____, _____,

_____

- Allows us to determine if triangles are congruent without having info on all 6 pairs of sides and angles.

_____
Theorem

"Corresponding Parts of Congruent Triangles are Congruent"

- When you have two congruent triangles, use this to determing which parts of the triangles are congruent.

Parts of a triangle:

_____ _____ _____

_____ _____ _____

Examples:

In examples 1–5, use the figure at right to explain why each congruence is true. *WXYZ* is a parallelogram.

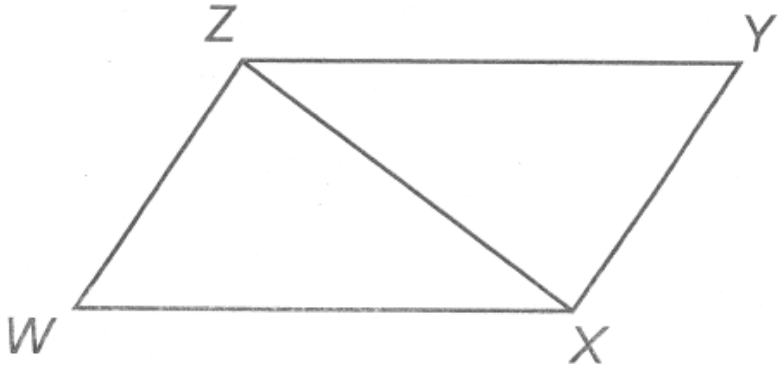
1. $\angle WXZ \cong \angle YZX$

2. $\angle WZX \cong \angle YXZ$

3. $\overline{XZ} \cong \overline{ZX}$

4. $\Delta WZX \cong \Delta YXZ$

5. $\angle W \cong \angle Y$



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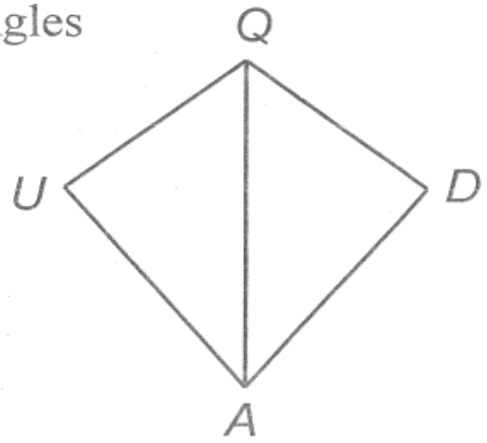
Use the given information to answer the question.

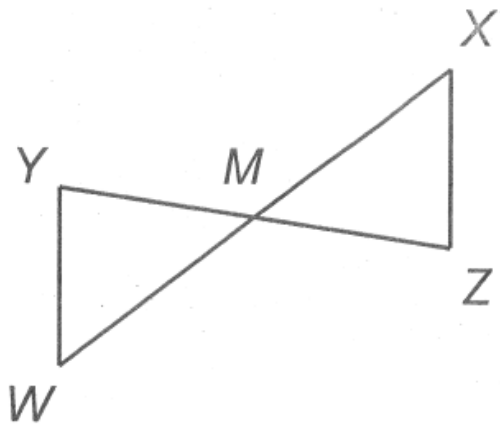
6. Given: $\angle U$ and $\angle D$ are right angles
$\overline{QU} \cong \overline{QD}$

Is $\overline{AU} \cong \overline{AD}$?



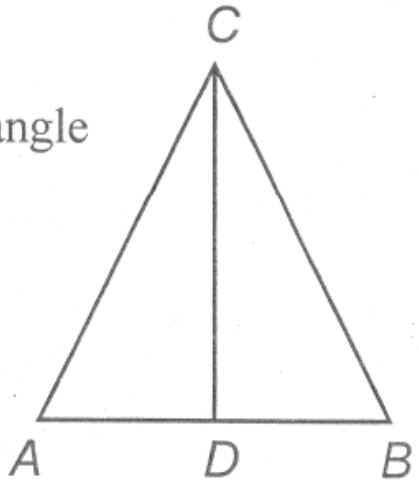
7. Given: M is the midpoint of $\overline{WX}$
M is the midpoint of $\overline{YZ}$

Is $\overline{YW} \cong \overline{ZX}$?



8. Given: ΔWZX is isosceles
$\overline{CD}$ is the bisector of the vertex angle

Is $\overline{AD} \cong \overline{BD}$?



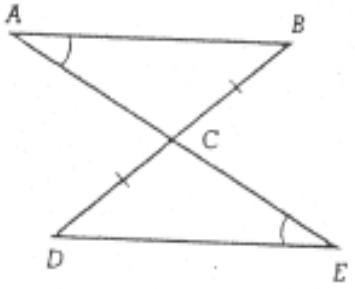
H.Geometry – Chapter 4 – Definition Sheet

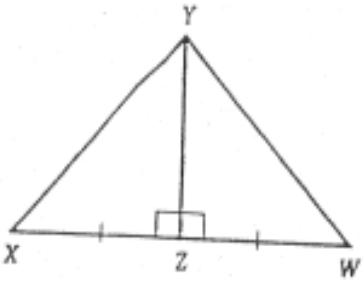
EXERCISES: IF THE GIVEN TRIANGLES ARE CONGRUENT,

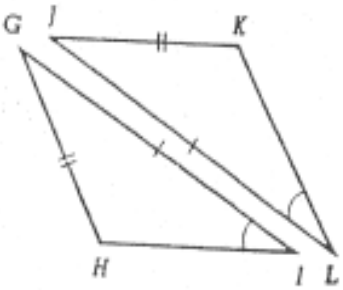
a) WRITE THE ABBREVIATION FOR THE NAME OF THE CONGRUENCE CONJECTURE THAT MAKES THE TRIANGLES CONGRUENT

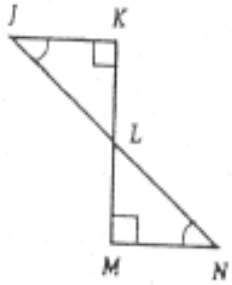
b) WRITE A CONGRUENCE STATEMENT FOR THE TRIANGLES.

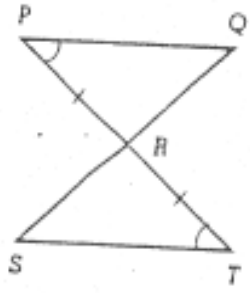
IF THE TRIANGLES ARE NOT CONGRUENT, WRITE "NONE"

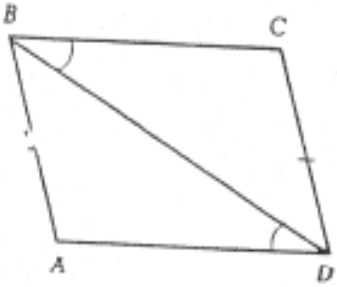
1. 

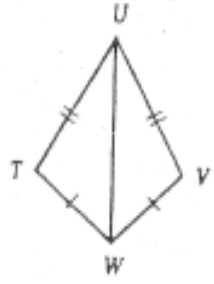
2. 

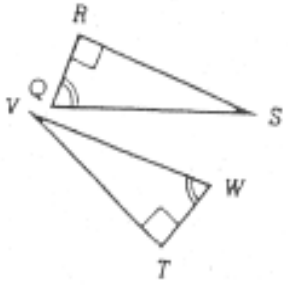
3. 

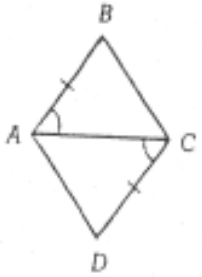
4. 

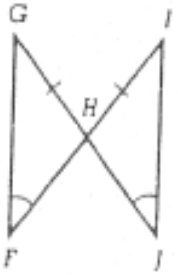
5. 

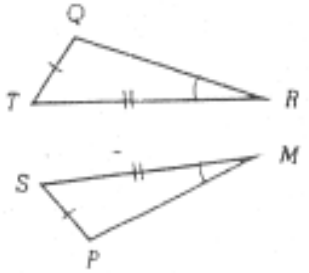
6. 

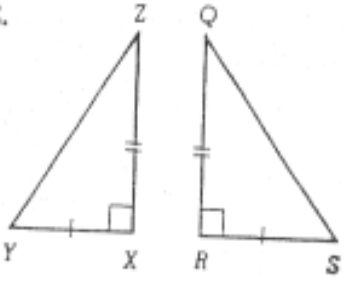
7. 

8. 

9. 

10. 

11. 

12. 

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Section 4.7

Proofs using congruent triangles

Formats: _____, _____-,

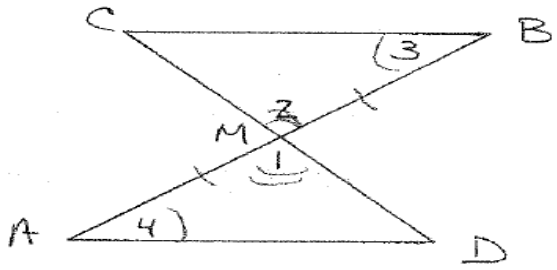
_____

EXAMPLE 1.

GIVEN: $\angle 3 \cong \angle 4$

$\overline{BM} \cong \overline{AM}$

PROVE: $\overline{AD} \cong \overline{BC}$



CONCLUSIONS	JUSTIFICATIONS
0. $\angle 3 \cong \angle 4$, $\overline{BM} \cong \overline{AM}$	0. _____
1. _____	1. VERTICAL ∠ THM
2. $\triangle AMD \cong \triangle BMC$	2. _____
3. _____	3. _____

Flowchart

- A concept map showing a step-by-step procedure through a complicated system or problem.
- Can be used to plan/visualize logical thinking
- Boxes – used to represent actions
- Arrows – used to connect boxes to show flow of actions through a logical progression

H.Geometry – Chapter 4 – Definition Sheet

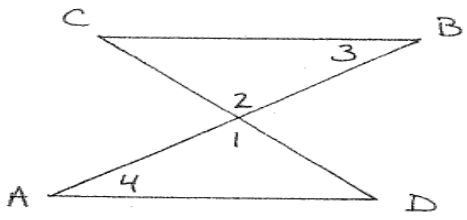
FLOW-CHART PROOF:

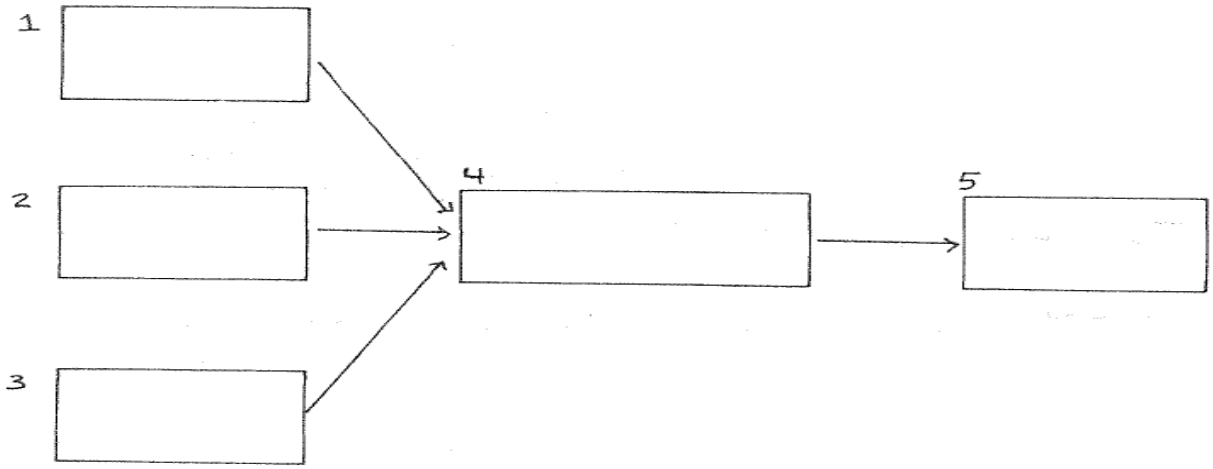
EXAMPLE 1 (AGAIN)

GIVEN: $\angle 3 \cong \angle 4$

$\overline{BM} \cong \overline{AM}$

PROVE: $\overline{AD} \cong \overline{BC}$

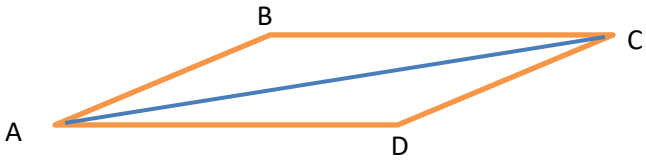


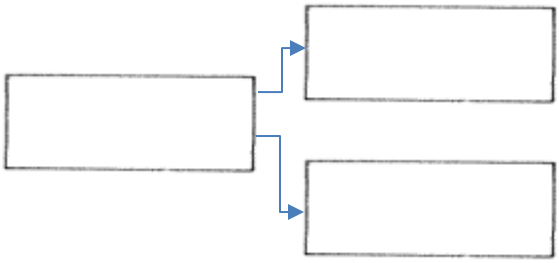


Example 2:

Given: ABCD is a parallelogram

Prove: < B $\cong$ <D





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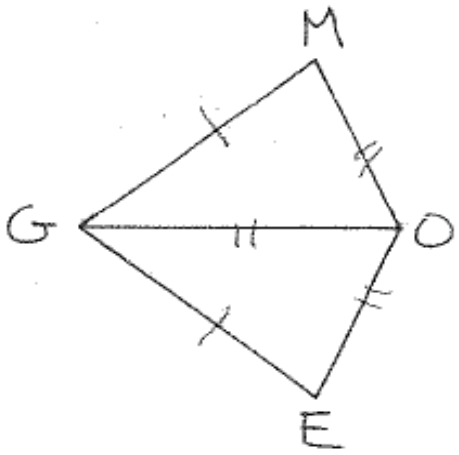
EXAMPLE 3.

GIVEN: $\overline{GE} \cong \overline{GM}$

$\overline{EO} \cong \overline{MO}$

PROVE: $\angle E \cong \angle M$



1 [ ]

2 [ ]

3 [ ]

4 [ ]

5 [ ]

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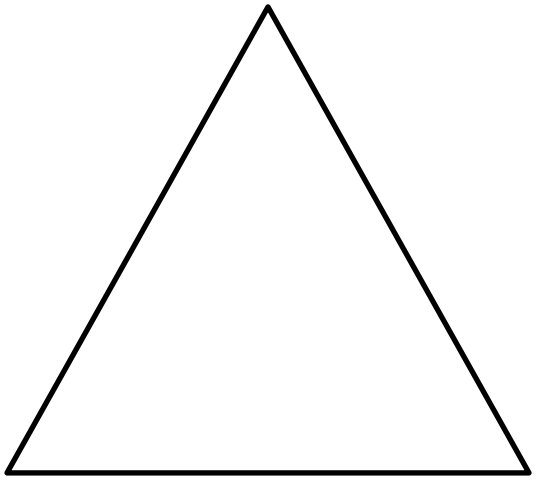
Section 4.8	
Vertical Angle Bisector Theorem	In an Isosceles Triangle, the angle bisector of the vertex angle is also the _____, the _____ _____ and the _____ 

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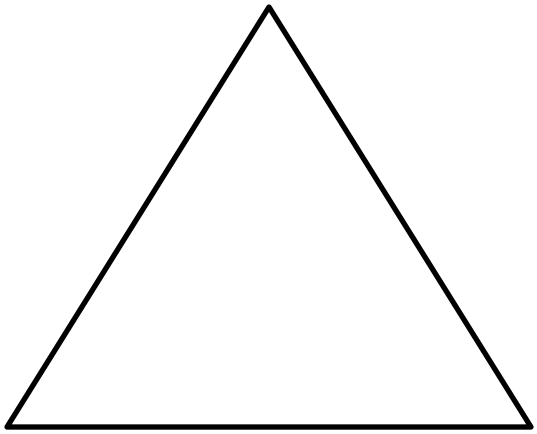
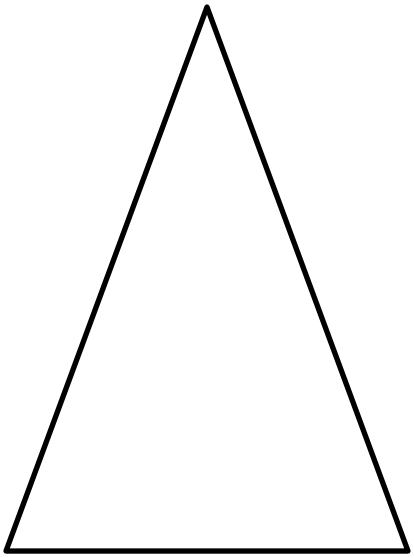
How do the medians of an isosceles triangle relate to each other?	
Isosceles Triangle Medians Theorem	In an Isosceles Triangle, the medians to the legs are _____
How do the altitudes of an isosceles triangle relate to each other?	
Isosceles Triangle Altitudes Theorem	In an Isosceles Triangle, the altitudes to the legs are _____

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