Geometry R
Unit 5 - Day 1 Notes v3

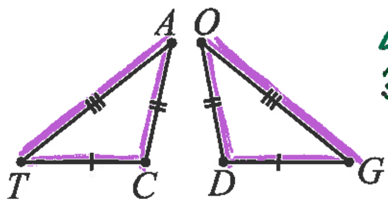
Name:______________________
Date:____________________

Proving Triangles Congruent

look for + reflexive
- sides
- angles

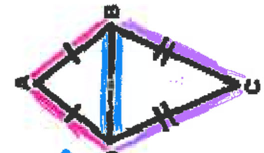
hidden givens ⇒ + vertical ∠s

1. Side-Side-Side Triangle Congruency (SSS)



$\triangle CAT \cong \triangle DOG$
3 pairs of ≅ sides
CA = DO
CT = DG
AT = OG

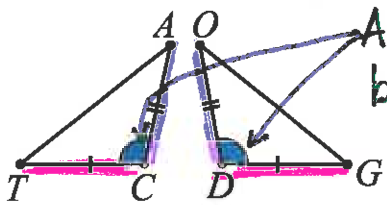
Are the triangles congruent by SSS. Why or why not?



NO, because even though $\overline{AB} \cong \overline{AD}$, they are from the same △

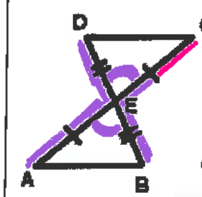
DB ≅ DB by reflexive

2. Side-Angle-Side Triangle Congruency (SAS)



Angle is formed by both sides

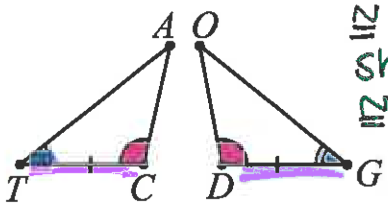
Are the triangles congruent by SAS? Why or why not?



Yes, vertical ∠s are ≅ and they are formed by the pairs of ≅ sides

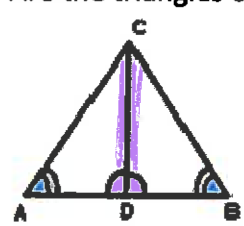
so △CED ≅ △AEB

3. Angle-Side-Angle Triangle Congruency (ASA)



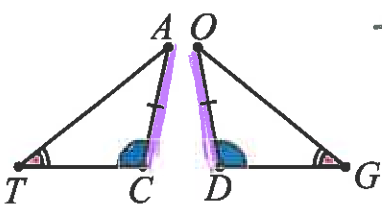
≅ sides are shared by the ≅ ∠s

Are the triangles congruent by ASA? Why or why not?



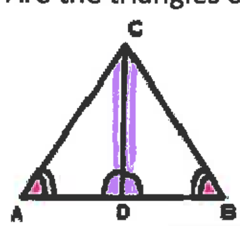
No, we do not know if $\overline{AD} \cong \overline{BD}$

4. Angle-Angle-Side Triangle Congruency (AAS)



the side is not shared by the angles.

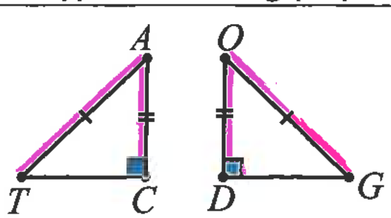
Are the triangles congruent by AAS? Why or why not?



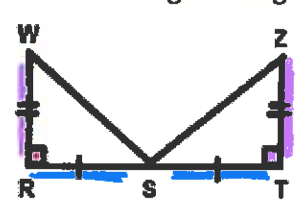
Yes, since $\overline{CD} \cong \overline{CD}$ by reflexive

△ADC ≅ △BDC

5. Hypotenuse-Leg (HL) – You must have a right ∠ for this to be used!



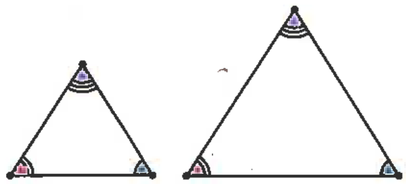
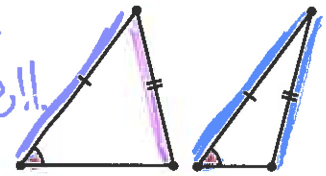
Are the triangles congruent by HL? Why or why not?



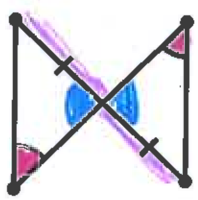
No, because we don't know if $\overline{WS} \cong \overline{ZS}$

but The △s are ≅ by SAS

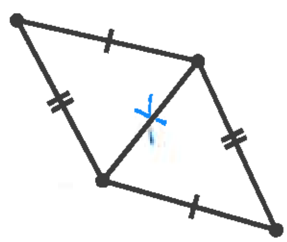
Methods that DO NOT prove Triangles to be Congruent

AAA	No swearing in math class!! It is Not Nice!! ASS (or SSA) "Donkey Theorem"
	
Why does AAA not guarantee congruent triangles? Dilations preserve ∠ measure not length.	Why does ASS not guarantee congruent triangles? 2 different sized Δ's can be formed from SSA

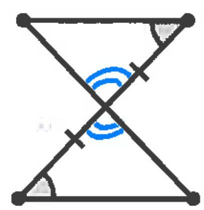
Examples: Which triangle postulate (if any) shows that the triangles are congruent?

1. 

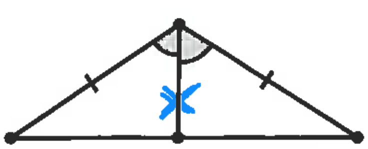
AAS

2. 

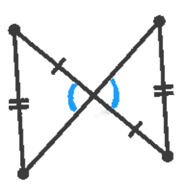
SSS

3. 

ASA

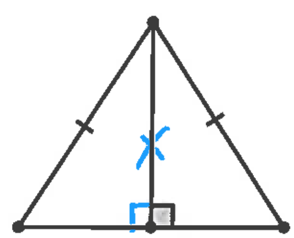
4. 

SAS

5. 

NONE

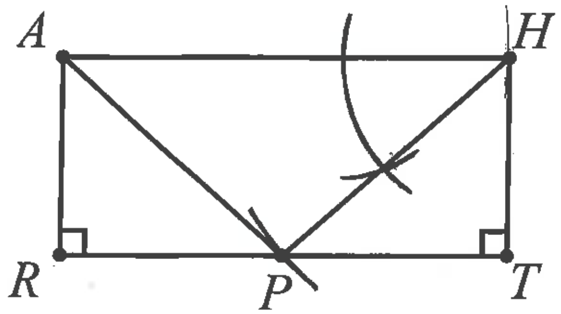
"DONKEY Thm"

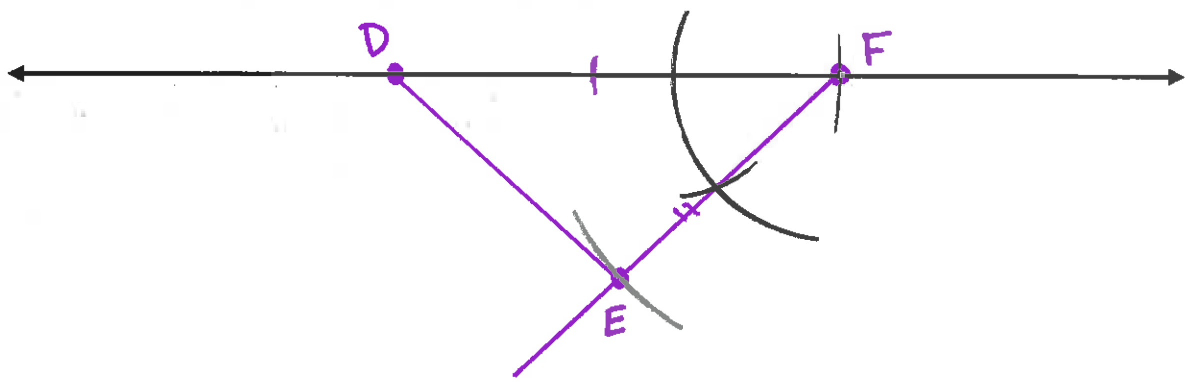
6. 

HL

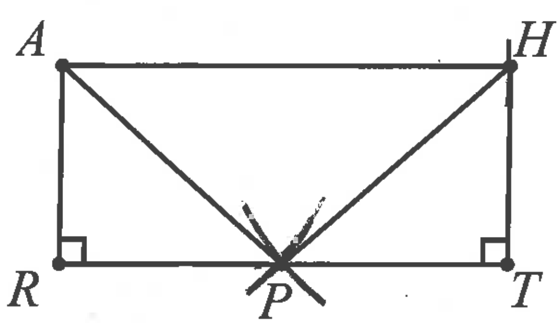
Justifying Congruent Triangles Using Constructions:

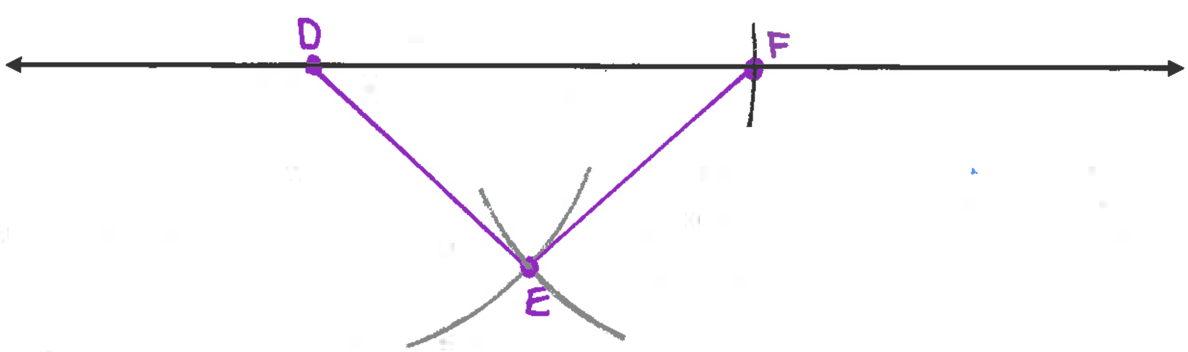
1. On the line, construct and Label ΔDEF so that $\Delta DEF \cong \Delta APH$ using the SAS congruency postulate.





2. On the line, construct and Label ΔDEF so that $\Delta DEF \cong \Delta APH$ using the SSS congruency postulate.

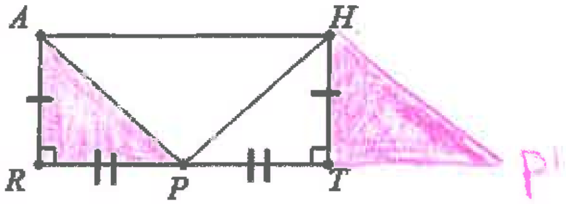




Justifying Congruent Triangles Using Rigid Motions:

1. Use Rigid Motions to Prove: $\Delta ARP \cong \Delta HTP$

Step 1:

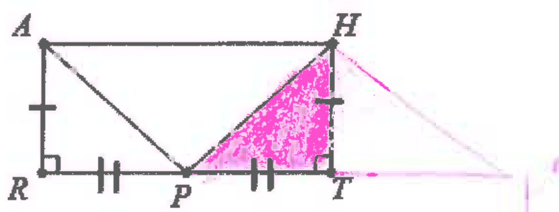


Action: (Specifically describe the Rigid Motion)
Translate ΔARP along vector $\overrightarrow{RT}$

Result: (State where each point maps to)
This forms $\Delta HTP'$ where $R \to T$, $P \to P'$ & $A \to H$

Reasoning: (Justify why the mappings are valid)
$R \to T$ because of the defined vector $\overrightarrow{RT}$. $A \to H$ because $\overline{AR} \cong \overline{HT}$ and $\angle R \cong \angle T$ b/c translation preserves $\angle$ measure & distance.

Step 2:

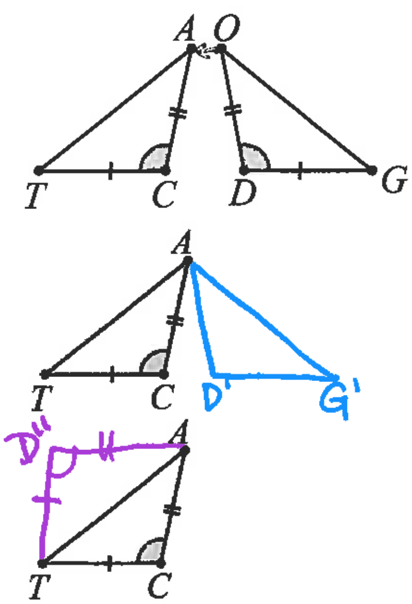


Action: Reflect $\Delta HTP'$ over $\overline{HT}$

Result: This forms ΔTHP where $T \to T$, $H \to H$ and $P' \to P$

Reasoning: T & H remain the same since they are on $\overline{HT}$, $P' \to P$ because $\overline{TP} \cong \overline{TP'}$ and reflection preserves the distance.

2. Use Rigid Motions To Prove: $\Delta CAT \cong \Delta DOG$



1. Translate ΔDOG along vector $\overrightarrow{OA}$, this moves
$O \to A$
$D \to D'$
$G \to G'$
because $\overrightarrow{OA}$, this makes $\Delta CAT \cong \Delta D'AG'$ since translation is a rigid motion, distance & $\angle$ measure are preserved.

2. Rotate $\Delta D'AG'$ about point A counterclockwise
$A \to A$
$G' \to T$
$D' \to D''$
Since Rotations are rigid motions we now have $\Delta CAT \cong \Delta D''AT$

3. Reflect over $\overline{AT}$ forming ΔCAT. Since reflection is a rigid motion & $\overline{AC} \cong \overline{AD''}$ and $\overline{CT} \cong \overline{D''T}$ we know $\Delta D''AT \cong \Delta CAT$