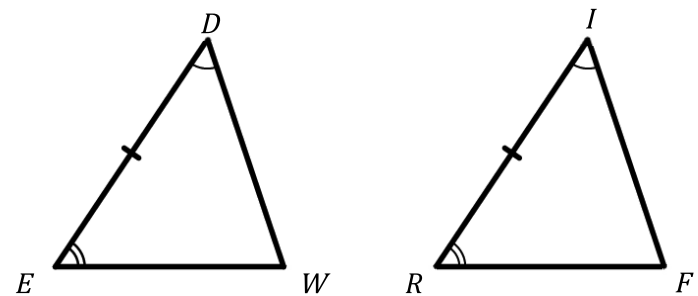
Section 6 – Topic 7
Triangle Congruence – ASA and AAS – Part 1

TAKE NOTE! *Postulates & Theorems*

Angle-Side-Angle (ASA) Congruence Postulate

If two angles and the included side of one triangle are congruent to two angles and the included side of a second triangle, then the two triangles are congruent.

Consider the figures below.



In the above diagram, $\Delta WED \cong \Delta FRI$ based on the ASA Congruence Postulate.

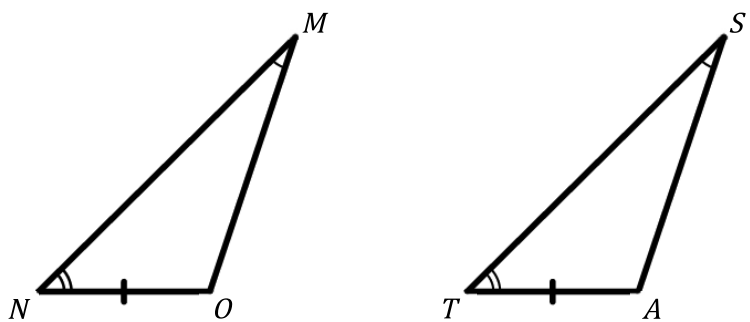
Name the congruent sides and angles in these two triangles.

TAKE NOTE! Postulates & Theorems

Angle-Angle-Side (AAS) Congruence Postulate

If two angles and a non-included side of one triangle are congruent to two angles and a non-included side of a second triangle, then the two triangles are congruent.

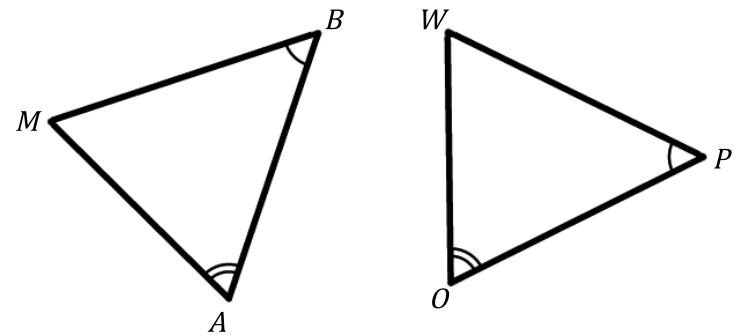
Consider the figures below.



In the above diagram, $\Delta MON \cong \Delta SAT$ based on the AAS Congruence Postulate.

Name the congruent sides and angles in these two triangles.

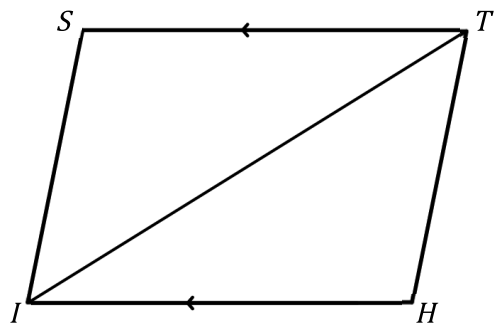
Consider the triangles below.



Identify the postulate you could use to prove that the two triangles are congruent, given each additional congruence statement below.

Congruency Statement	Postulate
$\overline{BM} \cong \overline{PW}$	
$\overline{AB} \cong \overline{OP}$	
$\overline{AM} \cong \overline{OW}$	

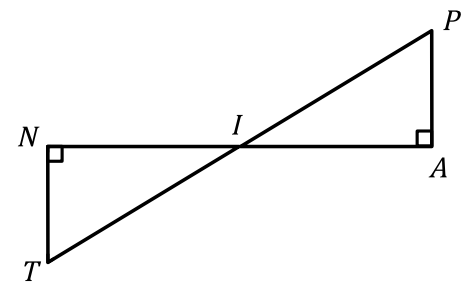
Consider the figure below.



Nadia would like to use the AAS Congruence Postulate to prove that $\Delta TIS \cong \Delta ITH$. Would knowing that $\angle S \cong \angle H$ be enough information for Nadia to use this postulate? If not, find the missing congruence statement.

Let's Practice!

1. Consider ΔPAI and ΔTNI in the diagram below.



Given: $\angle N$ and $\angle A$ are right angles; I is the midpoint of $\overline{PT}$

Prove: $\Delta PAI \cong \Delta TNI$

Based on the above figure and the information below, complete the following two-column proof.

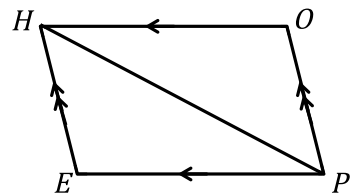
Statements	Reasons
1. $\angle N$ and $\angle A$ are right angles	**1.** Given
2. $\angle N \cong \angle A$	**2.**
3. I is the midpoint of $\overline{PT}$	**3.** Given
4.	**4.** Definition of midpoint
5. $\angle TIN \cong \angle AIP$	**5.**
6. $\Delta PAI \cong \Delta TNI$	**6.**

Try It!

2. Consider ΔOHP and ΔEPH in the diagram below.

Given: $\overline{OH} \parallel \overline{EP}$; $\overline{EH} \parallel \overline{OP}$

Prove: $\Delta OHP \cong \Delta EPH$



Based on the above figure and the information below, complete the following two-column proof.

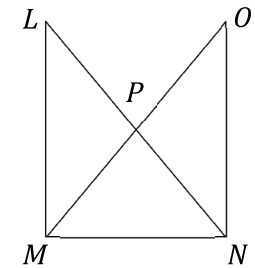
Statements	Reasons
1. $\overline{OH} \parallel \overline{EP}$	**1.** Given
2.	**2.** Alternate interior angles theorem
3. $\overline{EH} \parallel \overline{OP}$	**3.** Given
4. $\angle PHE \cong \angle HPO$	**4.**
5.	**5.** Reflexive property
6. $\Delta OHP \cong \Delta EPH$	**6.**

Section 6 – Topic 8
Triangle Congruence – ASA and AAS – Part 2

Let's Practice!

1. Consider the figure below.

Given: $\overline{PM} \cong \overline{PN}, \overline{LM} \perp \overline{MN}, \overline{MN} \perp \overline{ON}$
$\overline{LN}$ bisects $\angle MNO, \overline{OM}$ bisects $\angle LMN$.
Prove: $\Delta MPL \cong \Delta NPO$

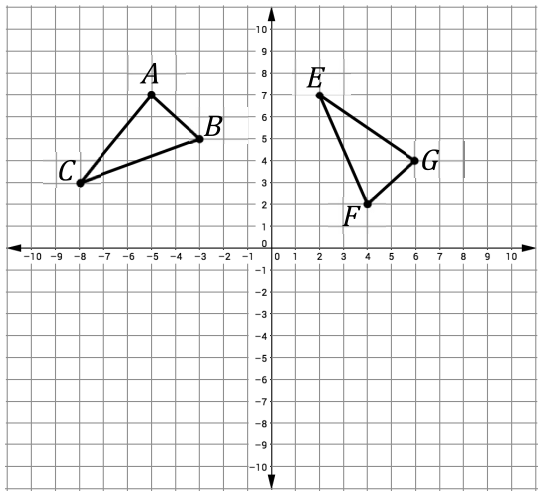


Based on the above figure and the information below, complete the following two-column proof.

Statements	Reasons
1. $\overline{PM} \cong \overline{PN}$	**1.** Given
2. $\overline{LM} \perp \overline{MN}, \overline{MN} \perp \overline{ON}$	**2.** Given
3. $\overline{LN}$ bisects $\angle MNO$ and $\overline{OM}$ bisects $\angle LMN$.	**3.** Given
4.	**4.** Definition of ⊥ lines.
5. $m\angle LMP = m\angle ONP = 45°$	**5.**
6.	**6.** Vertical Angles
7. $\Delta MPL \cong \Delta NPO$	**7.**

Try It!

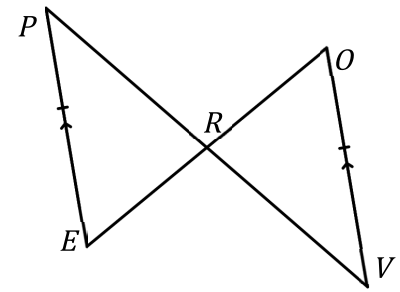
2. Consider the figures below.



How would you prove $\Delta ABC \cong \Delta GFE$ by applying ideas of transformations?

BEAT THE TEST!

1. Consider the diagram below.



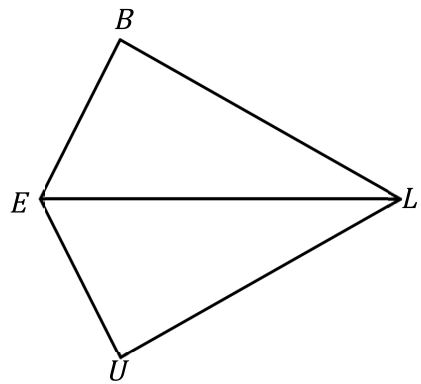
Given: $\overline{PE} \cong \overline{OV}$; $\overline{PE} \parallel \overline{OV}$

Prove: $\Delta PRE \cong \Delta VRO$

Select the most appropriate reason for #5.

Statements	Reasons
1. $\overline{PE} \cong \overline{OV}$	**1.** Given
2. $\overline{PE} \parallel \overline{OV}$	**2.** Given
3. $\angle PER \cong \angle VOR$	**3.** Alternate Interior Angles Theorem
4. $\angle ERP \cong \angle ORV$	**4.** Vertical angle theorem
5. $\Delta PRE \cong \Delta VRO$	**5.** Ⓐ AAS Ⓑ ASA Ⓒ SAS Ⓓ SSS

2. Consider the figure below.



Kendrick is making a design for a t-shirt.

Part A: What transformation(s) will prove $\Delta BLE \cong \Delta ULE$? Justify your answer.

Part B: If he knows that $\overline{EL}$ is the angle bisector of $\angle BEU$, what additional information is needed to prove that $\Delta BLE \cong \Delta ULE$ using ASA?

Ⓐ $\overline{BE} \cong \overline{EU}$
Ⓑ $\angle BLE \cong \angle EUL$
Ⓒ $\angle EBL \cong \angle EUL$
Ⓓ $\angle ELB \cong \angle ULE$