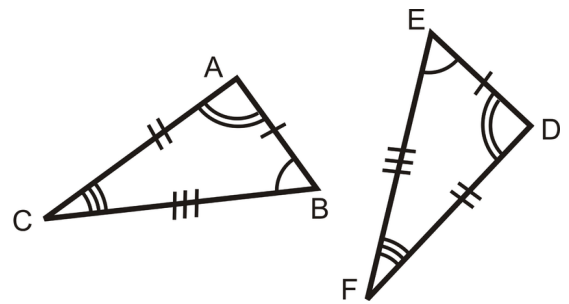


Unit 4 Lesson 5 – Congruent Triangles, SSS, SAS, ASA, and AAS

- Congruent figures are figures with the same SHAPE and SIZE
 - When 2 figures are congruent, you can move 1 so that it fits exactly on the other
 - REFLECTION, TRANSLATION, and ROTATION are all translations that result in congruent figures
 - Can you think of a transformation from Unit 1 that would not result in a congruent figure?
DILATION
- Congruent polygons have congruent CORRESPONDING parts (matching sides and angles)
 - When triangles are congruent, in proofs, we write C.P.C.T.C. which stands for corresponding parts of congruent triangles are congruent

- When naming congruent polygons, always list corresponding vertices in the same order
 - Write a congruence statement for the two triangles shown here:

$$\underline{\triangle ABC} \cong \underline{\triangle DEF}$$



- Given: $\triangle WYS \cong \triangle MKV$. List the corresponding congruent parts without a picture.

- $\angle W \cong \underline{\angle M}$

- $\angle S \cong \underline{\overline{MK}}$

- $\overline{YS} \cong \underline{\hspace{2cm}}$

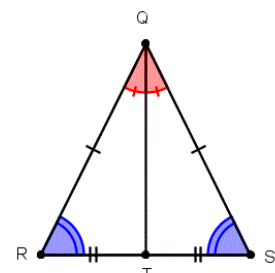
- $\angle Y \cong \underline{\angle K}$
 $\underline{\angle V}$

- $\overline{WY} \cong \underline{\hspace{2cm}}$
 $\underline{\overline{KV}}$

- $\overline{SW} \cong \underline{\overline{VM}}$

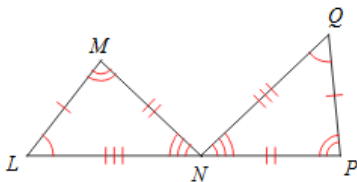
- Write a congruence statement for the two triangles shown here:

$$\underline{\triangle RTQ} \cong \underline{\triangle STQ}$$



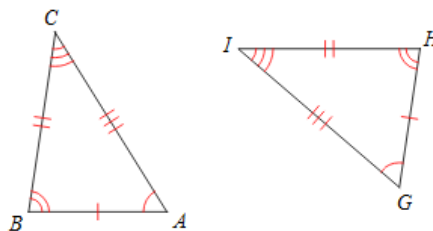
Write a statement of congruence for each triangle below:

1)



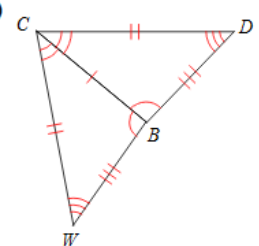
$$\underline{\triangle LMN} \cong \underline{\triangle QPN}$$

2)



$$\underline{\triangle ABC} \cong \underline{\triangle GHI}$$

3)

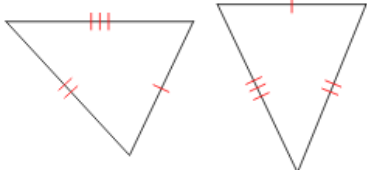
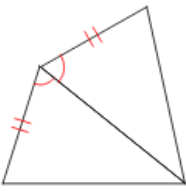
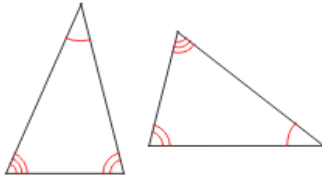
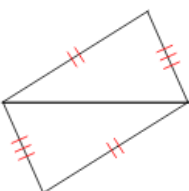
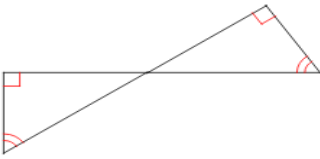
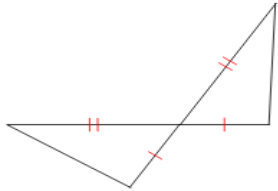
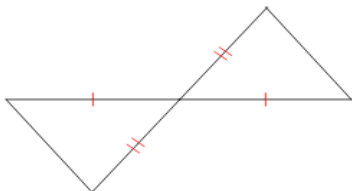
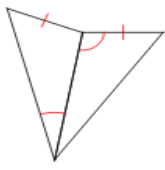

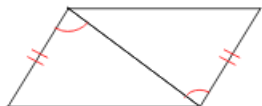
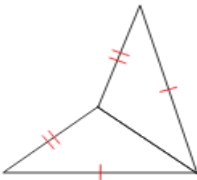
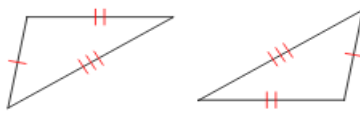


$$\underline{\triangle WBC} \cong \underline{\triangle DBC}$$

Proving Congruence in Triangle

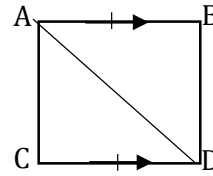
- Before we proved two triangles were congruent by showing that all six pairs of corresponding parts were congruent. It is possible to prove two triangles congruent using fewer parts.
- **SIDE SIDE SIDE** (SSS) Congruence – If three sides of one triangle are congruent to three sides of a second triangle, then the triangles are congruent.
- **SIDE ANGLE SIDE** (SAS) Congruence – If two sides and the included angle of one triangle are congruent to two sides and the included angle of a second triangle, then the triangles are congruent.
- **ANGLE SIDE ANGLE** (ASA) Congruence – If two angles and the included side of one triangle are congruent to two angles and the included side of another triangle, then the triangles are congruent.
- **ANGLE ANGLE SIDE** (AAS) Congruence – If two angles and the non-included side of one triangle are congruent to the corresponding two angles and side of a second triangle, then the two triangles are congruent.

State if the two triangles are congruent. If they are, state how you know. (SSS, SAS, ASA, and AAS).

1)  <u>SSS</u>	2)  <u>SAS</u>	3)  <u>NOT \cong</u>	4)  <u>SSS</u>
5)  <u>NOT \cong</u>	6)  <u>SAS</u>	7)  <u>SAS</u>	8)  <u>NOT \cong</u>
9)  <u>NOT \cong</u>	10)  <u>SAS</u>	11)  <u>SSS</u>	12)  <u>SSS</u>

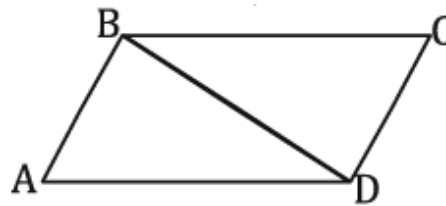
Proving Triangles Congruent

- Reflexive Property of Triangle Congruence $\rightarrow \triangle ABC \cong \triangle ABC$
- Symmetric Property of Triangle Congruence \rightarrow If $\triangle ABC \cong \triangle EFG$, then $\triangle EFG \cong \triangle ABC$



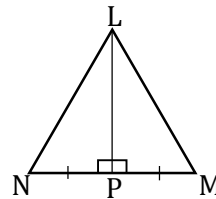
Given the figure below, prove that $\triangle ACD \cong \triangle CAB$.

Statement	Reason
1. $AB = CD, \overline{AB} \parallel \overline{CD}$	GIVEN
2. $\angle BAC \cong \angle DCA$	ALTERNATE INTERIOR ANGLES
3. $AC = AC$	REFLEXIVE PROPERTY
4. $\triangle ACD \cong \triangle CAB$	SAS



Given $\overline{AB} \cong \overline{CD}, \overline{AD} \cong \overline{CB}$, prove $\triangle ABD \cong \triangle CBD$.

Statement	Reason
1. $\overline{AB} \cong \overline{CD}$	GIVEN
2. $\overline{AD} \cong \overline{CB}$	GIVEN
3. $\overline{BD} \cong \overline{BD}$	REFLEXIVE PROPERTY
4. $\triangle ABD \cong \triangle CBD$	SSS



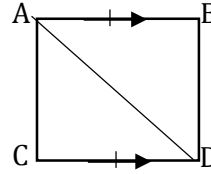
Given the figure below, prove that $\triangle NPL \cong \triangle MPL$.

Statement	Reason
1. $NP = PM, \overline{NP} \perp \overline{PL}$	GIVEN
2. $\angle MPL$ is a right angle $\angle NPL$ is a right angle	DEFINITION OF PERPENDICULAR
3. $PL = PL$	REFLEXIVE PROPERTY
4. $\triangle NPL \cong \triangle MPL$	SAS

Proving Triangles Congruent

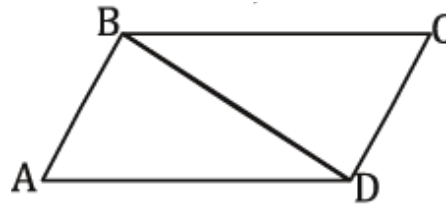
- Reflexive Property of Triangle Congruence $\rightarrow \triangle ABC \cong \triangle ABC$
- Symmetric Property of Triangle Congruence \rightarrow If $\triangle ABC \cong \triangle EFG$, then $\triangle EFG \cong \triangle ABC$

Given the figure below, prove that $\triangle ACD \cong \triangle CAB$.



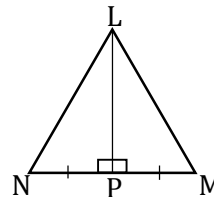
Statement	Reason
1. $AB = CD, \overline{AB} \parallel \overline{CD}$	GIVEN
2. $\angle BAD \cong \angle ADC$	ALTERNATE INTERIOR ANGLES
3. $AD = AD$	REFLEXIVE PROPERTY
4. $\triangle ACD \cong \triangle ADB$	SAS

Given $\overline{AB} \cong \overline{CD}, \overline{AD} \cong \overline{CB}$, prove $\triangle ABD \cong \triangle CBD$.



Statement	Reason
1. $\overline{AB} \cong \overline{CD}$	GIVEN
2. $\overline{AD} \cong \overline{CB}$	GIVEN
3. $\overline{BD} \cong \overline{BD}$	REFLEXIVE PROPERTY
4. $\triangle ABD \cong \triangle CBD$	SSS

Given the figure below, prove that $\triangle NPL \cong \triangle MPL$.

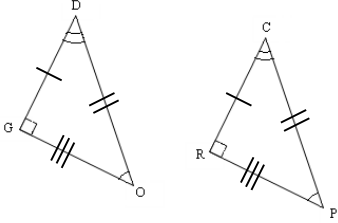


Statement	Reason
1. $NP = PM, \overline{NP} \perp \overline{PL}$	GIVEN
2. $\angle MPL$ is a right angle $\angle NPL$ is a right angle	GIVEN, RIGHT ANGLES ARE CONGRUENT
3. $PL = PL$	REFLEXIVE PROPERTY
4. $\triangle NPL \cong \triangle MPL$	SAS

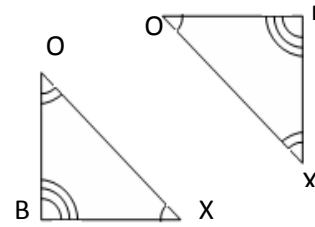
Unit 4 Lesson 5-Classwork/Homework

I. Name the congruent triangles.

1. $\triangle OGD \cong \triangle$ **PRC**

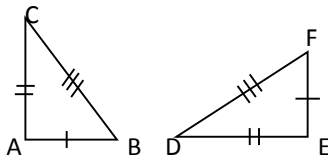


2. $\triangle BOX \cong \triangle$ **FXO**

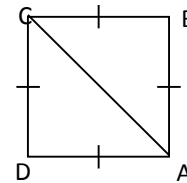


II. For each pair of triangles, tell whether the triangles are congruent by a postulate. If they are write a similarity statement.

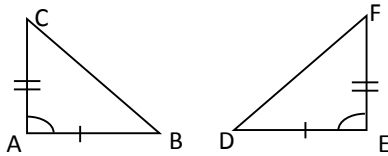
3. $\triangle ABC \cong \triangle$ **EDF** **SSS**



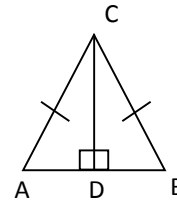
4. $\triangle ABC \cong \triangle$ **CDA** **SSS**



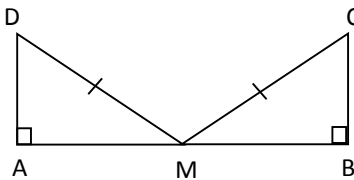
5. $\triangle ABC \cong \triangle$ **EDF** **SAS**



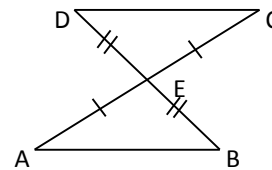
6. $\triangle ADC \cong \triangle$ **BDC** **HL**



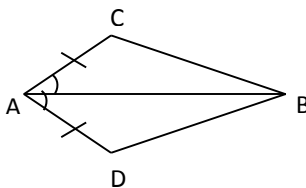
7. $\triangle MAD \cong \triangle$ **NOT \cong**



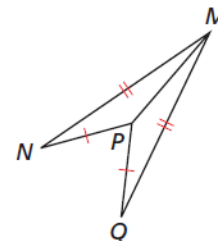
8. $\triangle ABE \cong \triangle$ **CDE** **SAS**



9. $\triangle ACB \cong \triangle$ **ADB** **SAS**

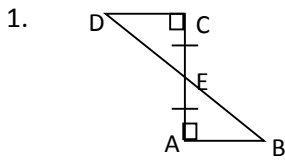


10. $\triangle MNP \cong \triangle$ **MQP** **SSS**



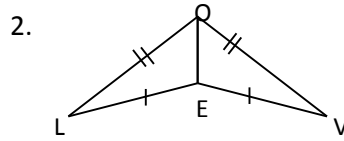
Practice Proofs

For each pair of triangles, tell: (a) Are they congruent (b) Write the triangle congruency statement. (c) Give the postulate that makes them congruent. Then write a prove in the bale provided.



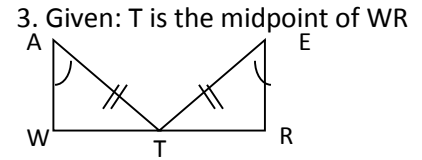
- a. **YES**
 b. Δ **DCE** \cong Δ **BAE**
 c. **ASA**

Statement	Reason
$\angle C \cong \angle A$	GIVEN
$\overline{CE} \cong \overline{AE}$	GIVEN
$\angle CED \cong \angle AEB$	VERTICAL \angle
$\Delta DCE \cong \Delta BAE$	ASA



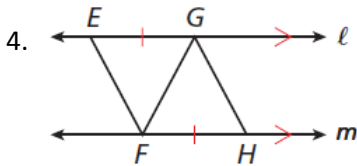
- a. **YES**
 b. Δ **OEL** \cong Δ **OEV**
 c. **SSS**

Statement	Reason
$\overline{LO} \cong \overline{VO}$	GIVEN
$\overline{LE} \cong \overline{VE}$	GIVEN
$\overline{EO} \cong \overline{EO}$	REFLEXIVE
$\Delta OEL \cong \Delta OEV$	SSS



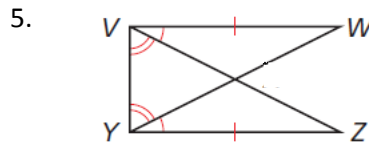
- a. **NO**
 b. Δ _____ \cong Δ _____
 c. _____

Statement	Reason



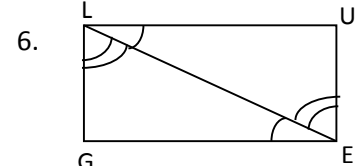
- a. **YES**
 b. Δ **EGF** \cong Δ **HFG**
 c. **SAS**

Statement	Reason
$\overline{EG} \cong \overline{HF}$	GIVEN
$\angle EGF \cong \angle HFG$	ALT. INT.
$\overline{GF} \cong \overline{GF}$	REFLEXIVE
$\Delta EGF \cong \Delta HFG$	SAS



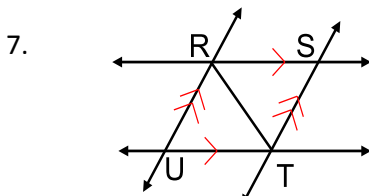
- a. **YES**
 b. Δ **VYW** \cong Δ **YVZ**
 c. **AAS**

Statement	Reason
$\angle V \cong \angle Y$	GIVEN
$\angle Y \cong \angle V$	GIVEN
$\overline{VW} \cong \overline{YZ}$	GIVEN
$\Delta VYW \cong \Delta YVZ$	AAS



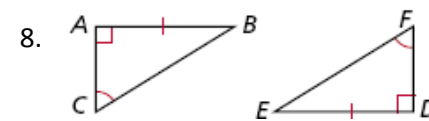
- a. **YES**
 b. Δ **ELG** \cong Δ **LEU**
 c. **ASA**

Statement	Reason
$\angle ULE \cong \angle GEL$	GIVEN
$\overline{LE} \cong \overline{EL}$	REFLEXIVE
$\angle ELG \cong \angle LEU$	GIVEN
$\Delta ELG \cong \Delta LEU$	ASA



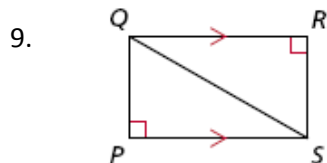
- a. **NO**
 b. Δ _____ \cong Δ _____
 c. _____

Statement	Reason



- a. **YES**
 b. Δ **ABC** \cong Δ **DEF**
 c. **AAS**

Statement	Reason
$\angle A \cong \angle D$	GIVEN
$\angle C \cong \angle F$	GIVEN
$\overline{BA} \cong \overline{ED}$	GIVEN
$\Delta ABC \cong \Delta DEF$	AAS



- a. **YES**
 b. Δ **QRS** \cong Δ **SPQ**
 c. **AAS**

Statement	Reason
$\angle R \cong \angle P$	GIVEN
$\angle RQS \cong \angle SPQ$	ALT. INT.
$\overline{QS} \cong \overline{SQ}$	REFLEXIVE
$\Delta QRS \cong \Delta SPQ$	AAS