

Notes 4-7: Triangle Congruence - CPCTC

Geometry - Ch. 4: Triangle Congruence

**Objective:** Use CPCTC to prove corresponding parts of triangles are congruent.

- We know 5 shortcuts to prove  $\Delta s \cong$ . They are SSS, SAS, ASA, AAS, HL.
- Once we know this, all 6 parts of the triangles are congruent, the 3 sides and the 3 angles.

**CPCTC:** Corresponding Parts of Congruent Triangles are Congruent

- This is used in proofs AFTER you prove the triangles are congruent.

This is not a theorem, but writing it as an If-Then statement can help.

Theorem	Hypothesis	Conclusion
If two triangles are congruent by <u>SSS</u> , then the remaining <u>corresponding</u> sides and angles are congruent.		$\Delta ABC \cong \Delta DBC$ by <u>SSS</u> . So, $\angle A \cong \angle D$ , $\angle ACB \cong \angle DCB$ , and $\Delta ABC \cong \Delta DBC$ by <u>CPCTC</u> .

**EX 1:** What can you conclude from the diagrams?

a)

$\Delta XYZ \cong \Delta WYZ$  by SAS.

So,  $\angle W \cong \angle X$ ,  $\angle V \cong \angle Y$ , and  $\overline{XY} \cong \overline{WY}$  by CPCTC.

b)

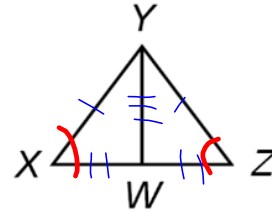
$\Delta TSW \cong \Delta TUV$  by ASA.

So,  $\overline{SW} \cong \overline{UV}$ ,  $\overline{ST} \cong \overline{UT}$ , and  $\angle S \cong \angle U$  by CPCTC.

**EX 2:** Given:  $\overline{YW}$  bisects  $\angle XZ$ , and  $\overline{YX} \cong \overline{YZ}$ .

Prove:  $\angle X \cong \angle Z$

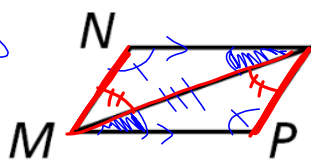
Statements	Reasons
1. $\overline{YW}$ bisects $\angle XZ$	1. Given
2. $\angle XWY \cong \angle ZWY$	2. Def. of bisect
3. $\overline{YX} \cong \overline{YZ}$	3. Given
4. $\overline{YW} \cong \overline{YW}$	4. Ref. Prop.
5. $\Delta XYW \cong \Delta ZYW$	5. SSS
6. $\angle X \cong \angle Z$	6. CPCTC



**EX 3:** Given:  $\overline{NO} \parallel \overline{MP}$ , and  $\angle N \cong \angle P$ .

Prove:  $\overline{NM} \parallel \overline{OP}$

ASA  
AAS



Statements	Reasons
1. $\overline{NO} \parallel \overline{MP}$	1. Given
2. $\angle NOM \cong \angle PMO$	2. Alt. Int. $\Delta s$ thm.
3. $\angle N \cong \angle P$	3. Given
4. $\overline{OM} \cong \overline{OM}$	4. Ref. Prop.
5. $\Delta NOM \cong \Delta PMO$	5. AAS
6. $\angle NMO \cong \angle POM$	6. CPCTC
7. $\overline{NM} \parallel \overline{OP}$	7. Conv. of A.I. $\Delta s$

