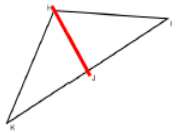
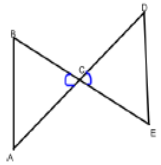
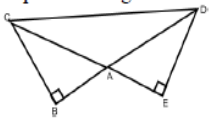
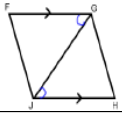
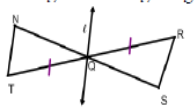
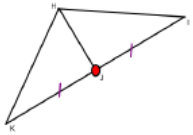
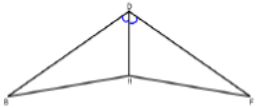
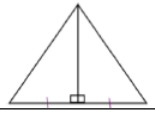
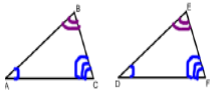
Name: _____ # _____

Geometry: Period _____
Ms. Pierre
Date: _____

Using Congruence to Prove Theorems

Today's Objective

SWBAT use CPCTC to prove parts of triangles are congruent.

9 Most Common Properties, Definitions and Theorems for Triangles		
1. **Reflexive Property:** $AB = BA$ When the triangles have an angle or side in common 	2. **Vertical Angles are Congruent** When two lines are intersecting 	3. **Right Angles are Congruent** When you are given right triangles and/or a square/ rectangle 
4. **Alternate Interior Angles of Parallel Lines are congruent** When the givens inform you that two lines are parallel 	5. **Definition of a segment bisector** Results in 2 segments being congruent 	6. **Definition of a Midpoint** Results in two segments being congruent 
7. **Definition of an angle bisector** Results in two angles being congruent 	8. **Definition of a perpendicular bisector** Results in 2 congruent segments and right angles. 	9. **3rd angle theorem** If 2 angles of a triangle are ≅ to 2 angles of another triangle, then the 3rd angles are ≅ 

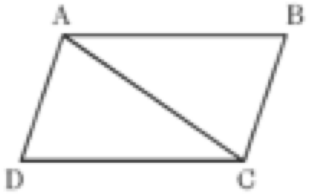
_____ is an abbreviation for the phrase **C**orresponding **P**arts of **C**ongruent **T**riangles are **C**ongruent. It can be used as justification in a proof after you have proven two triangles congruent.

Example 1

Given: $\overline{AB} \parallel \overline{DC}$

$\overline{AB} \cong \overline{DC}$

Prove: $m\angle DAC \cong m\angle BCA$



Statement	Reason
$\overline{AB} \parallel \overline{DC}$	
$\overline{AB} \cong \overline{DC}$	
$\angle BAC \cong \angle DCA$	
$\overline{AC} = \overline{AC}$	
$\Delta ADC \cong \Delta CBA$	
$m\angle DAC \cong m\angle BCA$	

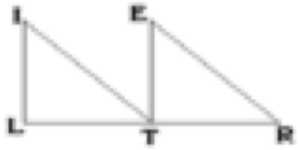
Example 2

Given: $\overline{LT} \cong \overline{TR}$

$\angle ILT \cong \angle ETR$

$\overline{IT} \parallel \overline{ER}$

Prove: $\Delta LIT \cong \Delta TER$



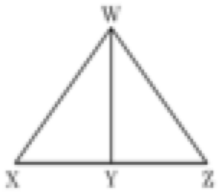
Statement	Reason
$\overline{LT} \cong \overline{TR}$	
$\angle ILT \cong \angle ETR$	
$\overline{IT} \parallel \overline{ER}$	
$\angle LTI \cong \angle ERT$	
$\Delta LIT \cong \Delta TER$	

Guided Practice

Given: $\overline{WY}$ is the angle bisector of $\angle XWZ$

$m\angle XYW \cong m\angle ZYW$

Prove: $\Delta WXY \cong \Delta WZY$

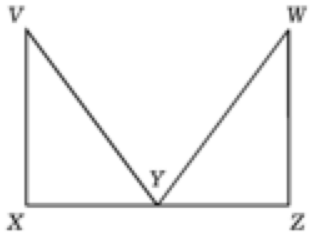


Statement	Reason
$\overline{WY}$ is the $\angle$bisector of $\angle XWZ$	
$m\angle XWY \cong m\angle ZWY$	
$\overline{WY} \cong \overline{WY}$	
$m\angle XYW \cong m\angle ZYW$	
$\Delta WXY \cong \Delta WZY$	

Guided Practice

Given: $\overline{VY} \cong \overline{WY}$
$\overline{VX} \cong \overline{WZ}$
Y is the midpoint of $\overline{XZ}$

Prove: $\Delta VXY \cong \Delta WYZ$

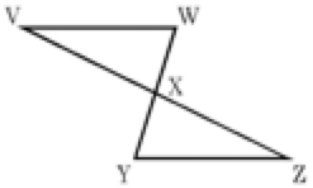


Statement	Reason
Y is the midpoint of $\overline{XZ}$	
$\overline{XY} \cong \overline{YZ}$	
$\overline{VY} \cong \overline{WY}$	
$\overline{VX} \cong \overline{WZ}$	
$\Delta VXY \cong \Delta WYZ$	

Independent Practice

Given: $\overline{VW} \parallel \overline{ZY}$
$\overline{WX} \cong \overline{YX}$

Prove: $\Delta VWX \cong \Delta ZYX$

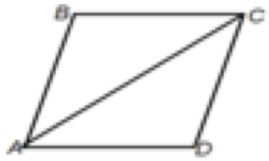


Statement	Reason
$\overline{VW} \parallel \overline{ZY}$	
$m\angle W \cong m\angle Y$	
$\overline{WX} \cong \overline{YX}$	
$m\angle VXW \cong m\angle ZXY$	
$\Delta VWX \cong \Delta ZYX$	

Homework

1. Given: $\overline{BC} \cong \overline{DA}$
$\overline{AC}$ bisects $\angle BCD$

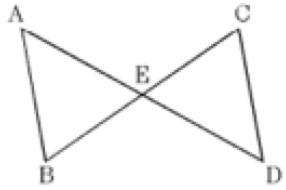
Prove: $\Delta ABC \cong \Delta CDA$



Statement	Reason
$\overline{BC} \cong \overline{DA}$	
$\overline{AC}$ bisects $\angle BCD$	
$\angle BCA \cong \angle DCA$	
$\overline{AC} = \overline{AC}$	
$\Delta ABC \cong \Delta CDA$	

2. Given: $\overline{AD}$ bisects $\overline{BC}$
$\overline{AE} \cong \overline{DE}$

Prove: $\overline{AB} \parallel \overline{CD}$



Statement	Reason
$\overline{AD}$ bisects $\overline{BC}$	
$\overline{BE} \cong \overline{CE}$	
	Vertical angles are congruent
$\overline{AE} = \overline{DE}$	
$\Delta ABE \cong \Delta DCE$	SAS
$m\angle A \cong m\angle D$	
$\overline{AB} \parallel \overline{CD}$	