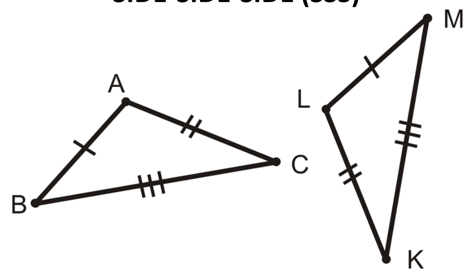
UNIT 3 STUDY SHEET – TRIANGLE CONGRUENCE

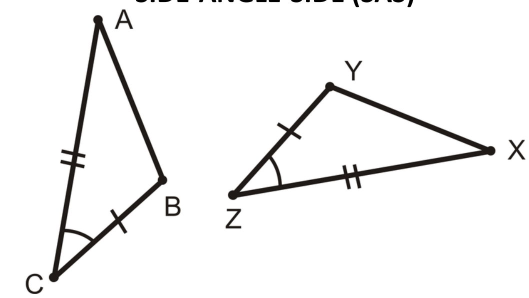
TOPIC #1: METHODS TO PROVE TRIANGLES CONGRUENT:

In order to prove triangles are congruent, you must prove **THREE corresponding parts are congruent!**

SIDE-SIDE-SIDE (SSS)

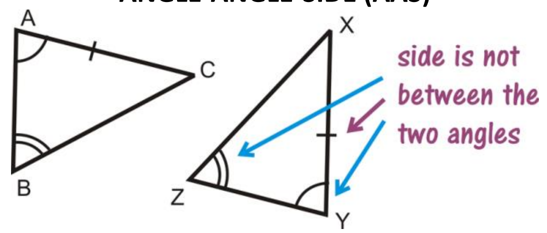


SIDE-ANGLE-SIDE (SAS)



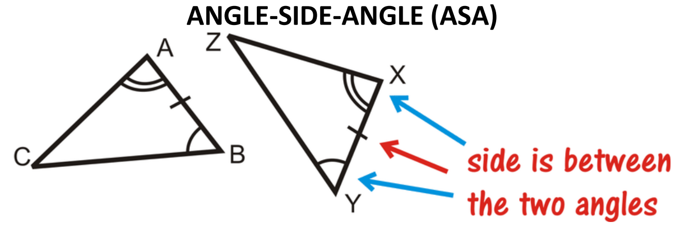
*SIDE MUST BE **INCLUDED** BETWEEN TWO ANGLES*

ANGLE-ANGLE-SIDE (AAS)



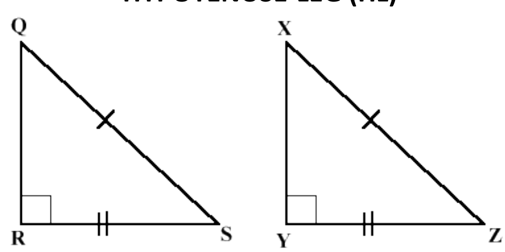
*SIDE IS **NOT INCLUDED** BETWEEN TWO ANGLES)

ANGLE-SIDE-ANGLE (ASA)



*ANGLE MUST BE **INCLUDED** BETWEEN TWO SIDES!*

HYPOTENUSE-LEG (HL)



*ONLY WORKS IN **RIGHT TRIANGLES** – **HYPOTENUSE** IS **ACROSS** FROM **RIGHT ANGLE**,THE TWO OTHER SIDES ARE **LEGS**!

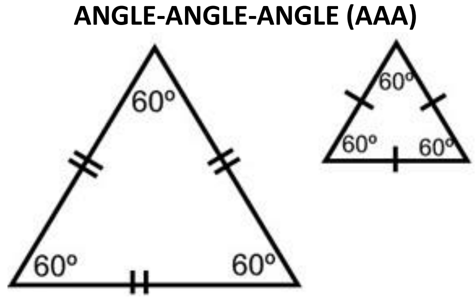
IN ORDER TO USE HL, YOU MUST FIRST STATE YOU HAVE RIGHT ANGLES AND RIGHT TRIANGLES!

STATEMENT #1: $\measuredangle QRS$ *and* $\measuredangle XYZ$ *are right angles* — *REASON #2:* Perpendicular lines form right angles

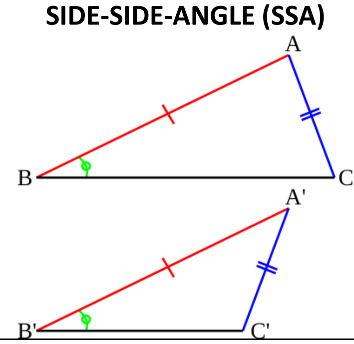
STATEMENT #2: ΔQRS *and* ΔXYZ *are right triangles* — *REASON #2:* Right Triangles have one right angle

METHODS THAT *CANNOT* BE USED TO PROVE TRIANGLES ARE CONGRUENT:

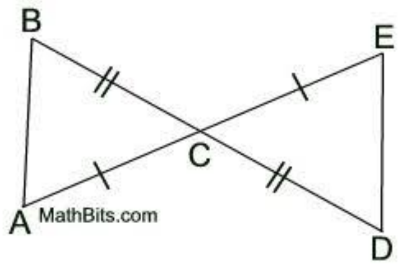
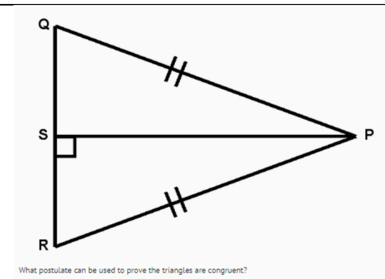
ANGLE-ANGLE-ANGLE (AAA)



SIDE-SIDE-ANGLE (SSA)



VISUAL FREEBIES!

VERTICAL ANGLES	REFLEXIVE POSTULATE
	

TOPIC #2: CPCTC

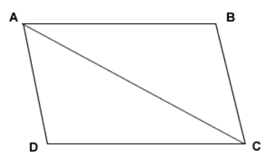
C̲ORRESPONDING P̲ARTS OF C̲ONGRUENT T̲RIANGLES ARE C̲ONGRUENT!

PARTS = *SIDES* AND *ANGLES*!

***HOW DO WE KNOW WHEN TO SAY "CPCTC?"** When the PROVE statement is not a triangle congruence statement!*

Given: $\overline{AB} \parallel \overline{CD}$ and $\overline{AB} \cong \overline{CD}$

Prove: $\overline{AD} \cong \overline{CB}$

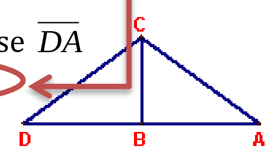


STATEMENT	REASON

Given: $\overline{CB} \perp \overline{DA}$

ΔDCA is isosceles with base $\overline{DA}$

Prove: B *is the midpoint of* $\overline{DA}$

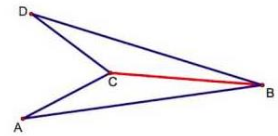
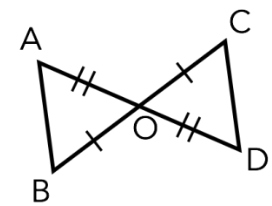
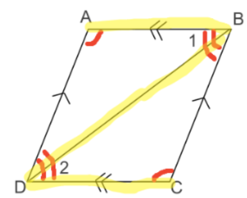
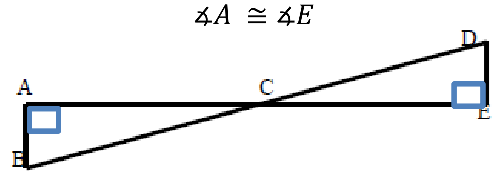
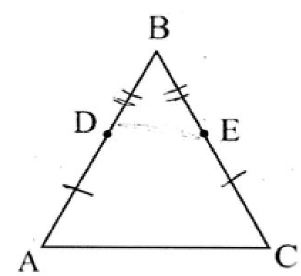
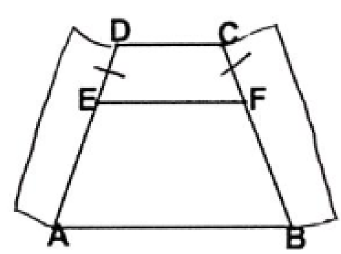


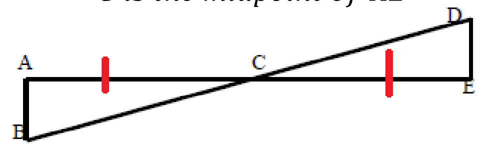
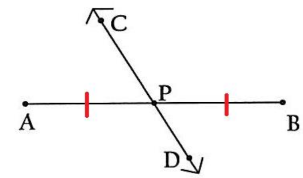
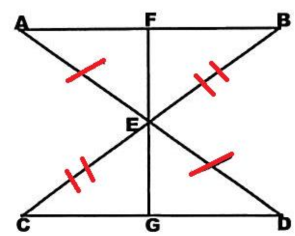
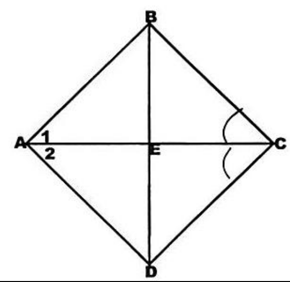
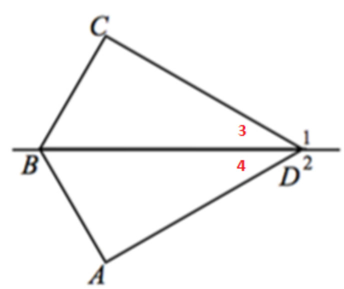
STATEMENT	REASON

****ORDER OF STATEMENTS****

1.)	***TRIANGLE CONGRUENCE STATEMENT*** *Example:* $\Delta DCB \cong \Delta ACB$	***POSTUALTE*** *Example:* $HL \cong HL$
2.)	***CORRESOPNDING "PARTS" – ANGLES OR SIDES*** *Example:* $\overline{DB} \cong \overline{BA}$	***CPCTC*** *Example:* CPCTC
3.)	***PROVE STATEMENT*** *Example:* B *is the* $\boldsymbol{midpoint}$ *of* $\overline{DA}$	***DEFINITION*** *Example: A* $\boldsymbol{midpoint}$ *creates two congruent segments*

TOPIC #3: COMMON PROOF STATEMENTS

POSTULATE/FACT	HOW TO RECOGNIZE IT/WHAT TO SAY	EXAMPLE
Reflexive Property	Where the colors overlap/the side or angle the triangles share *REASON:* Reflexive Property	
Vertical Angles	The bowties/The "X" *REASON:* Vertical angles are congruent	$\measuredangle AOB \cong \measuredangle COD$ 
Parallel Lines → Alternate Interior Angles	The "Z"! *REASON:* When two parallel lines are cut by a transversal, alternate interior angles are congruent	$\measuredangle 1 \cong \measuredangle 2$ 
Perpendicular Lines→ Right Angles	Follow the segments to see intersection If they share the same letter, that's where the right angle goes! *REASON:* Perpendicular lines form ***CONGRUENT*** right angles	If $\overline{\boldsymbol{AB}} \perp \overline{\boldsymbol{AE}}$, the right angle would be at A If $\overline{\boldsymbol{DE}} \perp \overline{\boldsymbol{AE}}$, the right angle would be at E $\measuredangle A \cong \measuredangle E$ 
ADDITION PROPERTY	Given two small parts of a side	*Given:* $\overline{AD} = \overline{CE}$ *and* $\overline{DB} + \overline{EB}$ $\overline{AB} = \overline{BC}$ $\overline{AB} = \overline{AD} + \overline{DB}$ $\overline{BC} = \overline{CE} + \overline{EB}$ 
SUBTRACTION PROPERTY	Given a large part and a small part of a side	Given: $\overline{AD} = \overline{CB}$ *and* $\overline{DE} = \overline{CF}$ $\overline{AE} = \overline{AD} - \overline{DE}$ $\overline{FB} = \overline{BC} - \overline{CF}$ 

Midpoint	Two "tick" marks only go on the segment named after the word midpoint. *REASON*: A midpoint creates two congruent segments	$C \text{ is the midpoint of } \overline{AE}$ 
Segment Bisector	Two "tick" marks **only** go on the segment named after the word bisect. *REASON*: A bisector creates two congruent segments	$\overline{CD}$ bisects $\overline{AB}$ at P  $\overline{AD}$ and $\overline{CB}$ bisect each other at E 
Angle Bisector	The "arc" marks **only** go on the angle named after the word bisect. *REASON*: A bisector creates two congruent angles	$\overline{AC}$ bisects $\angle BCD$ 
Supplements	$\measuredangle 1 + \measuredangle 3 = 180°$ $\measuredangle 2 + \measuredangle 4 = 180°$ *REASON:* Linear pairs are supplementary, therefore $\measuredangle 3 \cong \measuredangle 4$ *REASON*: Supplements of congruent angles are congruent	If $If\ \measuredangle 1 \cong \measuredangle 2, then\ \measuredangle 3 \cong \measuredangle 4$ 
Isosceles Triangles	When given two congruent sides, you can assume the base angles are also congruent. *REASON:* Isosceles triangles have two congruent base angles OR Isosceles triangles have two congruent sides.	$\Delta LMN \text{ is an Isosceles Triangle}$ $\overline{LM} \cong \overline{NM}$ $\measuredangle L \cong \measuredangle N$