Name: ____________________ Lesson #29 Date: ________

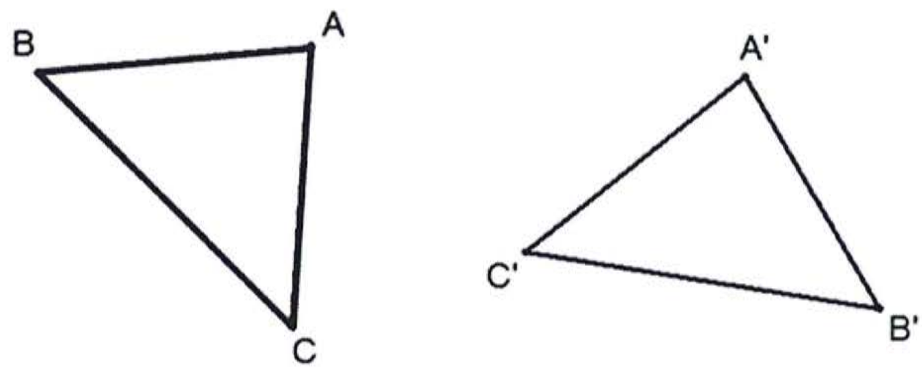
Common Core Geometry Period: ________

OBJECTIVE: How do we prove that triangles are congruent?

I. Important Statements:

1. Segments can be mapped onto segments **IF AND ONLY IF** they are ≅
2. Angles can be mapped onto angles **IF AND ONLY IF** they are ≅

Definition of Congruent: Two triangles (or figures) are aid to be congruent **IF AND ONLY IF** there is a series of rigid motions that maps the figure onto the other.



Given two triangles ΔABC and $\Delta A'B'C'$ such that $m\angle A \cong m\angle A'$, $\overline{AC} \cong \overline{A'C'}$, $\overline{AB} \cong \overline{A'B'}$.

Name the missing corresponding sides and angles

Find a composition of rigid motions to map ΔABC onto $\Delta A'B'C'$

I. Some new statements that we can use in a proof:

A. An **EQUILATERAL** triangle has 3 ≅ sides

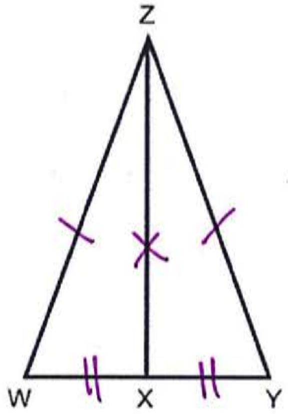
B. Base angles in an isosceles triangle are ≅

C. A median of a triangle creates a **MIDPOINT** on one side of the triangle

2. Given: Isosceles ΔZYW

$\overline{XZ}$ bisects $\overline{WY}$

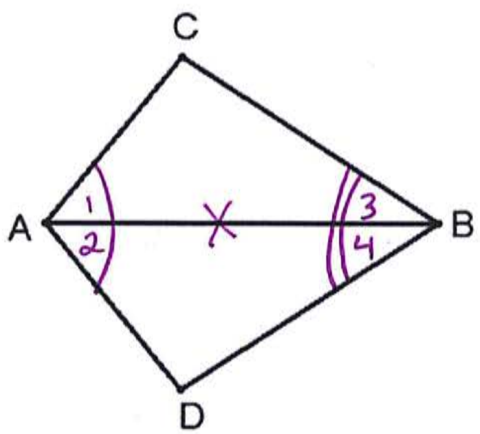
Prove $\Delta WZX \cong \Delta YZX$



S	R
① Iso ΔZYW $\overline{XZ}$ bisects $\overline{WY}$	① Given
② $\overline{WZ} \cong \overline{YZ}$	② An iso Δ has 2 $\cong$ sides
③ $\overline{XZ} \cong \overline{XZ}$	③ Reflexive
④ X is a mdpt of $\overline{WY}$	④ Seg bisector creates a mdpt
⑤ $\overline{WX} \cong \overline{YX}$	⑤ Mdpt creates 2 $\cong$ segments
⑥ $\Delta WZX \cong \Delta YZX$	⑥ SSS

3. Given $\overline{AB}$ bisects both $\angle$ ~~BAD~~ CAD and $\angle$ ~~BCD~~ CBD

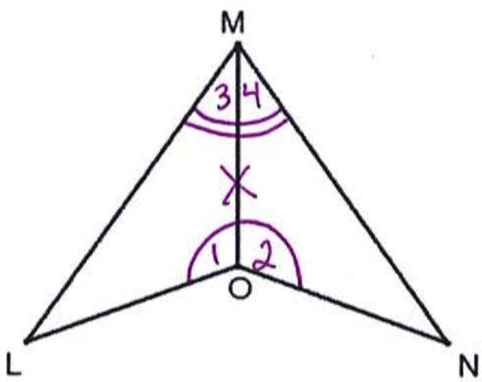
Prove $\Delta ABD \cong \Delta ABC$



S	R
① $\overline{AB}$ bisects both $\angle CBD$ & $\angle CAD$	① Given
② $\angle 1 \cong \angle 2$ $\angle 3 \cong \angle 4$	② An $\angle$ bisector creates 2 $\cong$ $\angle$s
③ $\overline{AB} \cong \overline{AB}$	③ Reflexive
④ $\Delta ABD \cong \Delta ABC$	④ ASA

6. Given $\overline{OM}$ bisects $\angle LMN$, $\angle LOM \cong \angle NOM$

Prove $\Delta LMO \cong \Delta NMO$



S	R
① $\overline{OM}$ bisects $\angle LMN$ $\angle LOM \cong \angle NOM$ $\angle 1 \cong \angle 2$	① Given
② $\angle 3 \cong \angle 4$	② An $\angle$ bisector creates 2 $\cong$ $\angle$s
③ $\overline{MO} \cong \overline{MO}$	③ Reflexive
④ $\Delta LMO \cong \Delta NMO$	④ ASA

7. If $\overline{AD}$ is the perpendicular bisector of $\overline{BC}$,

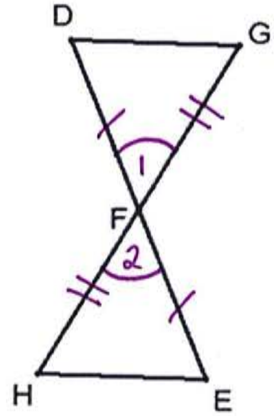
then prove $\Delta ABD \cong \Delta ACD$

S	R
① $\overline{AD}$ is $\perp$ bisector of $\overline{BC}$	① Given
② $\angle 1$ & $\angle 2$ are rt $\angle$s	② $\perp$ lines form rt $\angle$s
③ $\angle 1 \cong \angle 2$	③ All rt $\angle$s are $\cong$
④ D is the mdpt of $\overline{BC}$	④ A segment bisector creates a mdpt
⑤ $\overline{BD} \cong \overline{CD}$	⑤ A mdpt creates 2 $\cong$ seg
⑥ $\overline{AD} \cong \overline{AD}$	⑥ Reflexive
⑦ $\Delta ABD \cong \Delta ACD$	⑦ SAS

10. Given $\overline{DG}$ & $\overline{EH}$ bisect each other at F

Prove: Δ~~DEF~~ $\cong$ Δ~~GHF~~

$\Delta DGF \cong \Delta EHF$

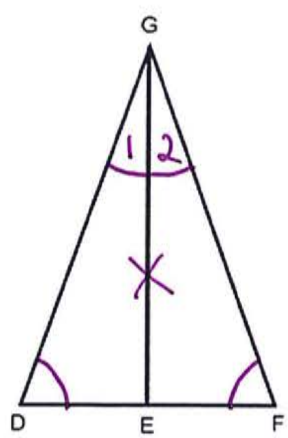


S	R
① $\overline{DG}$ & $\overline{EH}$ bisect at F	① Given
② F is mdpt of $\overline{DE}$ & $\overline{GH}$	② Segment bisector creates a mdpt.
③ $\overline{DF} \cong \overline{EF}$, $\overline{GF} \cong \overline{HF}$	③ A mdpt creates 2 $\cong$ segments
④ $\angle 1 \cong \angle 2$	④ Vertical $\angle$s are $\cong$
⑤ $\Delta DGF \cong EHF$	⑤ SAS

11. Given: $m\angle D = m\angle F$

$\overline{EH}$ bisects $\angle DGF$

Prove: $\Delta DGE \cong \Delta FGE$



S	R
① $m\angle D = m\angle F$, $\overline{EH}$ bisects $\angle DGF$	① Given
② $\angle 1 \cong \angle 2$	② An $\angle$ bisector creates 2 $\cong$ $\angle$s
③ $\overline{GE} \cong \overline{GE}$	③ Reflexive
④ $\Delta DGE \cong FGE$	④ AAS