

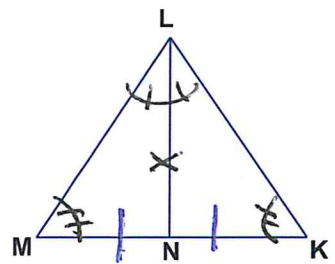
Name Schlansky
Mr. Schlansky

Date _____
Geometry



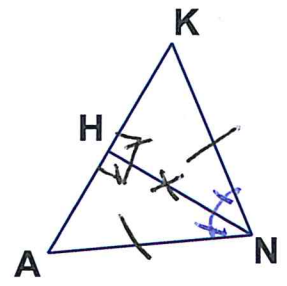
Triangle Proofs Using CPCTC

1. Given: \overline{LN} bisects $\angle KLM$
 $\angle LKM \cong \angle LMK$
Prove: N is the midpoint of \overline{MK}



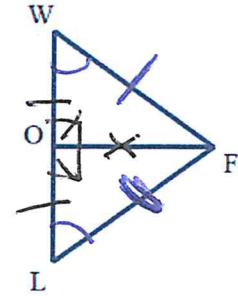
Statements	Reasons
① \overline{LN} bisects $\angle KLM$	① given
② $\angle MLN \cong \angle KLN$	② An angle bisector creates two congruent angles
③ $\angle LKM \cong \angle LMK$	③ given
④ $\overline{LN} \cong \overline{LN}$	④ Reflexive Property
⑤ $\triangle MLN \cong \triangle KLN$	⑤ AAS \cong AAS
⑥ $\overline{MN} \cong \overline{KN}$	⑥ CPCTC
⑦ N is the midpoint of \overline{MK}	⑦ A midpoint creates two congruent segments.

2. Given: $\overline{HN} \perp \overline{KA}$, $\overline{KN} \cong \overline{AN}$
Prove: \overline{HN} bisects $\angle KNA$



Statements	Reasons
① $\overline{HN} \perp \overline{KA}$	① given
② $\angle KHN \cong \angle ANH$	② Perpendicular lines form congruent right angles.
③ $\overline{KN} \cong \overline{AN}$	③ given
④ $\overline{HN} \cong \overline{HN}$	④ Reflexive Property
⑤ $\triangle KHN \cong \triangle ANH$	⑤ HL \cong HL
⑥ $\angle KNH \cong \angle ANH$	⑥ CPCTC
⑦ \overline{HN} bisects $\angle KNA$	⑦ An angle bisector creates two congruent angles

3. Given: \overline{OF} is the perpendicular bisector of \overline{WL}
 Prove: $\triangle WFL$ is isosceles



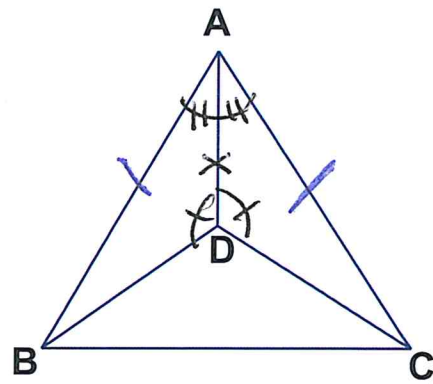
Statements

Reasons

- ① \overline{OF} is the perpendicular bisector of \overline{WL}
- ② $\overline{WO} \cong \overline{OL}$
- ③ $\angle WOF \cong \angle LOF$
- ④ $\overline{OF} \cong \overline{OF}$
- ⑤ $\triangle WOF \cong \triangle LOF$
- ⑥ $\overline{WF} \cong \overline{LF}$ ~~⑥ $\angle W \cong \angle L$~~
- ⑦ $\triangle WFL$ is isosceles

- ① given
- ② A line bisector creates two congruent segments
- ③ perpendicular lines form congruent right angles
- ④ Reflexive Property
- ⑤ SAS \cong SAS
- ⑥ CPCTC
- ⑦ An isosceles triangle has two congruent sides.

4. Given: $\angle ADB \cong \angle ADC$
 \overline{AD} bisects $\angle BAC$
 Prove: $\triangle ABC$ is isosceles



Statements

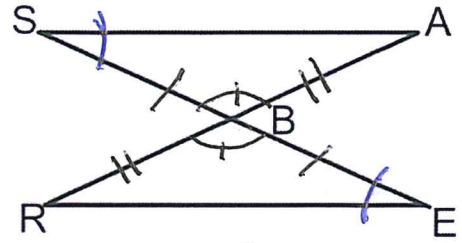
Reasons

- ① $\angle ADB \cong \angle ADC$
- ② \overline{AD} bisects $\angle BAC$
- ③ $\angle BAD \cong \angle CAD$
- ④ $\overline{AD} \cong \overline{AD}$
- ⑤ $\triangle ADB \cong \triangle ADC$
- ⑥ $\overline{AB} \cong \overline{AC}$
- ⑦ $\triangle ABC$ is isosceles

- ① given
- ② given
- ③ An angle bisector creates two congruent angles.
- ④ Reflexive Property
- ⑤ ~~ASA~~ ASA \cong ASA
- ⑥ CPCTC
- ⑦ An isosceles triangle has two congruent sides.

5. Given: \overline{SE} and \overline{AR} bisect each other.

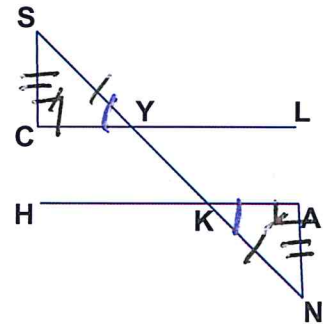
Prove that $\overline{SA} \parallel \overline{RE}$



Statements	Reasons
① \overline{SE} and \overline{AR} bisect each other	① given
② $\overline{SB} \cong \overline{BE}$, $\overline{RB} \cong \overline{BA}$	② A line bisector creates two congruent sides
③ $\angle SBA \cong \angle EBR$	③ Vertical angles are congruent
④ $\triangle SBA \cong \triangle EBR$	④ SAS \cong SAS
⑤ $\angle S \cong \angle E$	⑤ CPCTC
⑥ $\overline{SA} \parallel \overline{RE}$	⑥ Parallel lines cut by a transversal create congruent alternate interior angles.

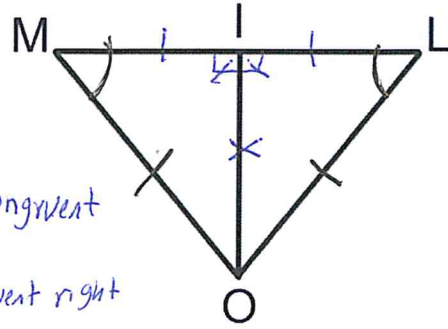
6. Given: $\overline{SC} \perp \overline{CL}$, $\overline{HA} \perp \overline{AN}$, $\overline{SY} \cong \overline{KN}$, and $\overline{SC} \cong \overline{AN}$.

Prove $\overline{CL} \parallel \overline{HA}$



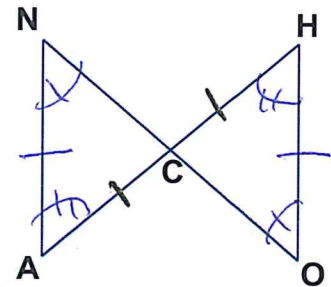
Statements	Reasons
① $\overline{SC} \perp \overline{CL}$, $\overline{HA} \perp \overline{AN}$	① given
② $\angle SCY \cong \angle NKA$	② Perpendicular lines form congruent right angles
③ $\overline{SY} \cong \overline{KN}$	③ given
④ $\overline{SC} \cong \overline{AN}$	④ given
⑤ $\triangle SCY \cong \triangle NKA$	⑤ HL \cong HL
⑥ $\angle SYC \cong \angle NKA$	⑥ CPCTC
⑦ $\overline{CL} \parallel \overline{HA}$	⑦ Parallel lines cut by a transversal create congruent alternate exterior angles.

7. Given: \overline{OI} is the perpendicular bisector of \overline{ML}
 Prove: $\triangle MLO$ is isosceles



Statements	Reasons
① \overline{OI} is the perpendicular bisector of \overline{ML}	① given
② $\overline{MI} \cong \overline{IL}$	② A line bisector creates two congruent segments
③ $\angle MIO \cong \angle LIO$	③ Perpendicular lines create congruent right angles.
④ $\overline{IO} \cong \overline{IO}$	④ Reflexive Property
⑤ $\triangle MIO \cong \triangle LIO$	⑤ SAS \cong SAS
⑥ $\angle IMO \cong \angle ILO$ or $\overline{MO} \cong \overline{LO}$	⑥ CPCTC
⑦ $\triangle MLO$ is isosceles	⑦ An isosceles triangle has two congruent angles

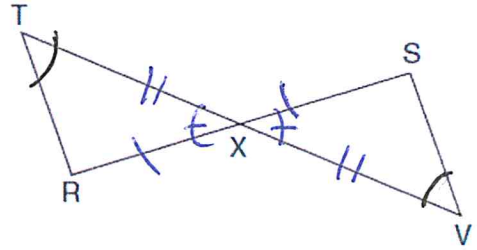
8. Given: $\overline{NA} \parallel \overline{HO}$, $\overline{NA} \cong \overline{HO}$
 Prove: \overline{NO} bisects \overline{HA}



Statements	Reasons
① $\overline{NA} \parallel \overline{HO}$	① given
② $\angle N \cong \angle O$, $\angle A \cong \angle H$	② Parallel lines cut by a transversal create congruent alternate interior angles.
③ $\overline{NA} \cong \overline{HO}$	③ given
④ $\triangle NAC \cong \triangle OHC$	④ ASA \cong ASA
⑤ $\overline{AC} \cong \overline{CH}$	⑤ CPCTC
⑥ \overline{NO} bisects \overline{HA}	⑥ A line bisector creates two congruent segments

9. Given: \overline{RS} and \overline{TV} bisect each other at point X
 \overline{TR} and \overline{SV} are drawn

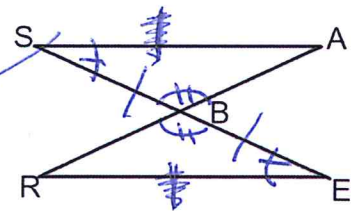
Prove: $\overline{TR} \parallel \overline{SV}$



statements	Reasons
① \overline{RS} and \overline{TV} bisect each other	① given
② $\overline{TX} \cong \overline{XV}$, $\overline{RX} \cong \overline{XS}$	② A line bisector creates two congruent segments
③ $\angle TXR \cong \angle VXS$	③ vertical angles are congruent
④ $\triangle TXR \cong \triangle VXS$	④ SAS \cong SAS
⑤ $\angle T \cong \angle V$	⑤ CPCTC
⑥ $\overline{TR} \parallel \overline{SV}$	⑥ Parallel lines cut by a transversal create congruent alternate interior angles

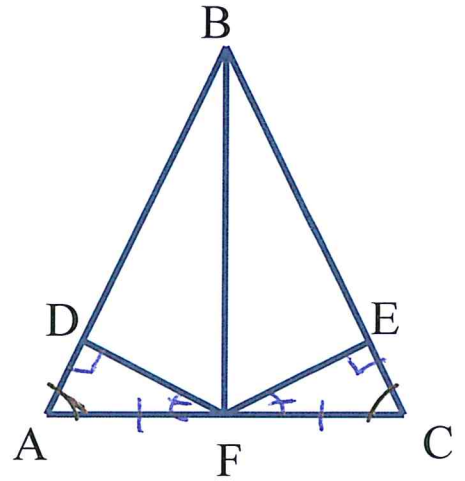
10. Given: $\overline{SA} \cong \overline{RE}$ and B is the midpoint of \overline{SE} .

Prove: $\overline{SA} \parallel \overline{RE}$.



statements	Reasons
① $\overline{SA} \cong \overline{RE}$ $\angle S \cong \angle E$	① given
② B is the midpoint of \overline{SE}	② given
③ $\overline{SB} \cong \overline{BE}$	③ A midpoint creates two congruent segments
④ $\angle SBA \cong \angle RBE$	④ vertical angles are congruent
⑤ $\triangle SBA \cong \triangle EBR$	⑤ ASA \cong ASA

11. Given: $\overline{FD} \perp \overline{BA}$, $\overline{FE} \perp \overline{BC}$, F is the midpoint of \overline{AC} ,
 $\angle DFA \cong \angle EFC$
 Prove: $\triangle ABC$ is isosceles



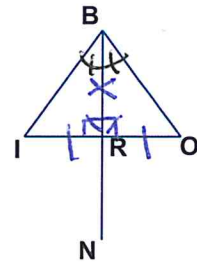
statements

Reasons

- ① $\overline{FD} \perp \overline{BA}$, $\overline{FE} \perp \overline{BC}$
- ② $\angle ADF \cong \angle CEF$
- ③ F is the midpoint of \overline{AC}
- ④ $\overline{AF} \cong \overline{FC}$
- ⑤ $\angle DFA \cong \angle EFC$
- ⑥ $\triangle ADF \cong \triangle CEF$
- ⑦ $\angle DAF \cong \angle BCF$
- ⑧ $\triangle ABC$ is isosceles

- ① given
- ② perpendicular lines form congruent right angles.
- ③ ~~for~~ given
- ④ A midpoint creates two congruent segments
- ⑤ given
- ⑥ AAS \cong AAS
- ⑦ CPCTC
- ⑧ An isosceles triangle has two congruent angles

12. Given: \overline{BR} is the perpendicular bisector of \overline{IO}
 Prove: \overline{NB} bisects $\angle OBI$



Statements

Reasons

- ① \overline{BR} is the perpendicular bisector of \overline{IO}
- ② $\angle BRI \cong \angle BRO$
- ③ $\overline{IR} \cong \overline{RO}$
- ④ $\overline{BR} \cong \overline{BR}$
- ⑤ $\triangle BRI \cong \triangle BRO$
- ⑥ $\angle IBR \cong \angle OBR$
- ⑦ \overline{NB} bisects $\angle OBI$

- ① given
- ② perpendicular lines form congruent right angles
- ③ A line bisector creates two congruent segments
- ④ Reflexive Property
- ⑤ SAS \cong SAS
- ⑥ CPCTC
- ⑦ An angle bisector creates two congruent angles
- ~~⑧ CPCTC~~