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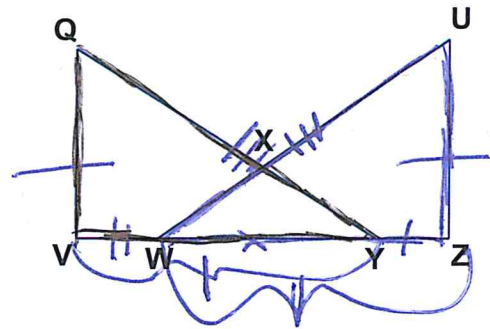
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Geometry



Triangle Proofs with Additional Tools

1. Given: $\overline{QV} \cong \overline{UZ}$, $\overline{VW} \cong \overline{YZ}$, $\overline{YQ} \cong \overline{WU}$
Prove: $\angle Q \cong \angle U$

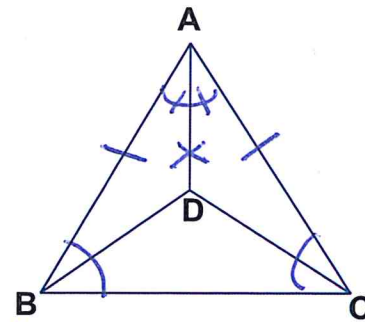
Statements	Reasons
① $\overline{QV} \cong \overline{UZ}$	① given
② $\overline{VW} \cong \overline{YZ}$	② given
③ $\overline{WY} \cong \overline{WY}$	③ Reflexive Property
④ $\overline{VY} \cong \overline{WZ}$ or $\overline{VW} + \overline{WY} = \overline{YZ} + \overline{WY}$	④ Addition Property
⑤ $\overline{YQ} \cong \overline{WU}$	⑤ given
⑥ $\triangle QVY \cong \triangle UZW$	⑥ SSS \cong SSS
⑦ $\angle Q \cong \angle U$	⑦ CPCTC



2. Given: $\angle ABC \cong \angle ACB$, \overline{AD} bisects $\angle BAC$

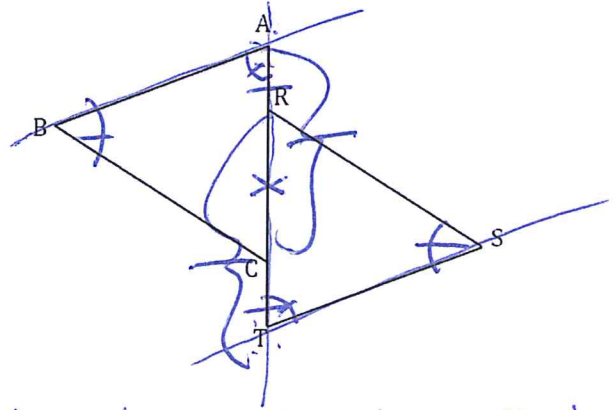
Prove: $\overline{BD} \cong \overline{DC}$

Statements	Reasons
① $\angle ABC \cong \angle ACB$	① given
② $\overline{AB} \cong \overline{AC}$	② Isosceles Triangle Theorem
③ \overline{AD} bisects $\angle BAC$	③ given
④ $\angle BAD \cong \angle CAD$	④ An angle bisector creates two congruent angles
⑤ $\overline{AD} \cong \overline{AD}$	⑤ Reflexive Property
⑥ $\triangle BAD \cong \triangle CAD$	⑥ SAS \cong SAS
⑦ $\overline{BD} \cong \overline{DC}$	⑦ CPCTC



3. Given: $\angle B \cong \angle S$, $\overline{AB} \parallel \overline{ST}$, $\overline{AR} \cong \overline{TC}$

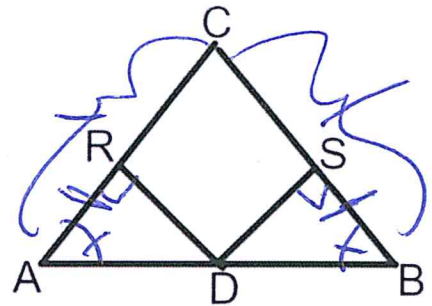
Prove: $\overline{BC} \cong \overline{SR}$



Statements	Reasons
① $\angle B \cong \angle S$	① given
② $\overline{AB} \parallel \overline{ST}$	② given
③ $\angle BAC \cong \angle RTS$	③ Parallel lines cut by a transversal create \cong alternate interior angles
④ $\overline{AR} \cong \overline{TC}$	④ given
⑤ $\overline{RC} \cong \overline{RC}$	⑤ Reflexive Property
⑥ $\overline{AC} \cong \overline{RT}$	⑥ Addition Property
$\overline{AR} + \overline{RC} = \overline{TC} + \overline{RC}$	
⑦ $\triangle BAC \cong \triangle STR$	⑦ AAS \cong AAS
⑧ $\overline{BC} \cong \overline{SR}$	⑧ CPCTC

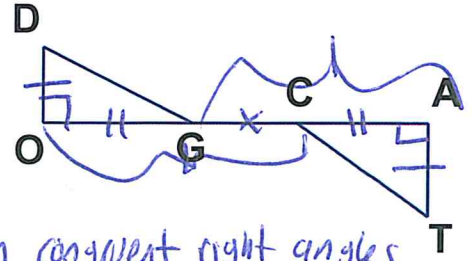
4. Given: In $\triangle ABC$, $\overline{CA} \cong \overline{CB}$, $\overline{AR} \cong \overline{BS}$, $\overline{DR} \perp \overline{AC}$, and $\overline{DS} \perp \overline{BC}$

Prove: $\overline{DR} \cong \overline{DS}$



Statements	Reasons
① $\overline{CA} \cong \overline{CB}$	① given
② $\angle RAD \cong \angle SBD$	② Isosceles Triangle Theorem
③ $\overline{AR} \cong \overline{BS}$	③ given
④ $\overline{DR} \perp \overline{AC}$, $\overline{DS} \perp \overline{BC}$	④ given
⑤ $\angle DRA \cong \angle DS B$	⑤ Perpendicular lines form congruent right angles
⑥ $\triangle DRA \cong \triangle DS B$	⑥ ASA \cong ASA
⑦ $\overline{DR} \cong \overline{DS}$	⑦ CPCTC

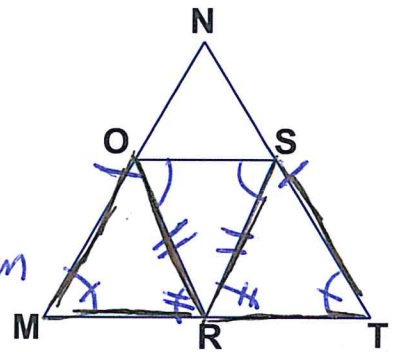
5. Given: $\overline{DO} \perp \overline{OA}$, $\overline{TA} \perp \overline{OA}$, $\overline{DO} \cong \overline{TA}$, $\overline{OC} \cong \overline{AG}$
 Prove: $\overline{DG} \cong \overline{TC}$



Statements	Reasons
① $\overline{DO} \perp \overline{OA}$, $\overline{TA} \perp \overline{OA}$	① given
② $\angle DOG \cong \angle CAT$	② Perpendicular lines form congruent right angles
③ $\overline{DO} \cong \overline{TA}$	③ given
④ $\overline{OC} \cong \overline{AG}$	④ given
⑤ $\overline{GC} \cong \overline{GC}$	⑤ Reflexive Property
⑥ $\overline{OG} \cong \overline{AC}$ or $\overline{OC} - \overline{GC} = \overline{AG} - \overline{GC}$	⑥ subtraction Property
⑦ $\triangle DOG \cong \triangle TAC$	⑦ SAS \cong SAS
⑧ $\overline{DG} \cong \overline{TC}$	⑧ CPCTC

6. Given: $\overline{MN} \cong \overline{NT}$, $\angle ROS \cong \angle RSO$, $\angle ORM \cong \angle SRT$

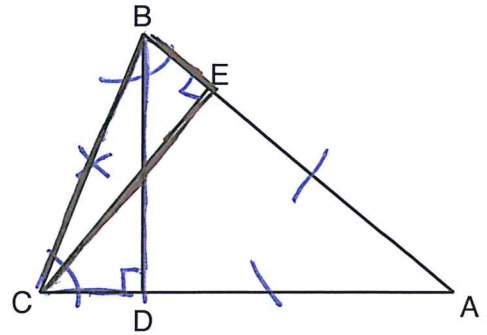
Prove: $\triangle MOR \cong \triangle TSR$



Statements	Reasons
① $\overline{MN} \cong \overline{NT}$	① given
② $\angle OMR \cong \angle STR$	② Isosceles Triangle Theorem
③ $\angle ROS \cong \angle RSO$	③ given
④ $\overline{RO} \cong \overline{RS}$	④ Isosceles Triangle Theorem
⑤ $\angle ORM \cong \angle SRT$	⑤ given
⑥ $\triangle MOR \cong \triangle TSR$	⑥ AAS \cong AAS

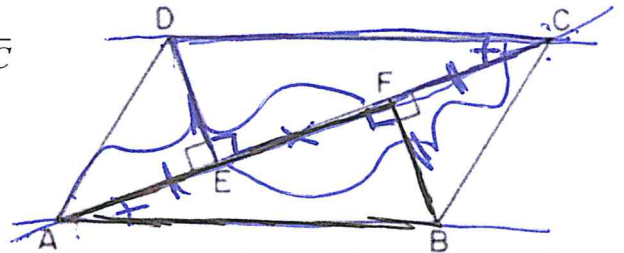
7. Given: $\overline{AB} \cong \overline{AC}$, $\overline{CE} \perp \overline{AB}$, $\overline{BD} \perp \overline{AC}$

Prove: $\overline{CE} \cong \overline{BD}$



Statements	Reasons
① $\overline{AB} \cong \overline{AC}$	① Given
② $\angle ABC \cong \angle ACB$	② Isosceles Triangle Theorem
③ $\overline{CE} \perp \overline{AB}$, $\overline{BD} \perp \overline{AC}$	③ Given
④ $\angle BEC \cong \angle CDB$	④ Perpendicular lines form congruent right angles
⑤ $\overline{CB} \cong \overline{CB}$	⑤ Reflexive Property
⑥ $\triangle BDC \cong \triangle CEB$	⑥ AAS \cong AAS
⑦ $\overline{CE} \cong \overline{BD}$	⑦ CPCTC

8. Given: $\overline{DC} \parallel \overline{AB}$, $\overline{AE} \cong \overline{CF}$, $\overline{DE} \perp \overline{AC}$, $\overline{BF} \perp \overline{AC}$
 Prove: $\triangle ABF \cong \triangle CDE$



Statements	Reasons
① $\overline{DC} \parallel \overline{AB}$	① Given
② $\angle FAB \cong \angle DCE$	② Parallel lines cut by a transversal create congruent alternate interior angles.
③ $\overline{AE} \cong \overline{CF}$	③ Given
④ $\overline{EF} \cong \overline{EF}$	④ Reflexive Property
⑤ $\overline{AF} \cong \overline{EC}$ or $\overline{AE} + \overline{EF} = \overline{CF} + \overline{EF}$	⑤ Addition Property
⑥ $\overline{DE} \perp \overline{AC}$, $\overline{BF} \perp \overline{AC}$	⑥ Given
⑦ $\angle BFA \cong \angle DEC$	⑦ Perpendicular lines form congruent right angles.
⑧ $\triangle ABF \cong \triangle CDE$	⑧ ASA \cong ASA