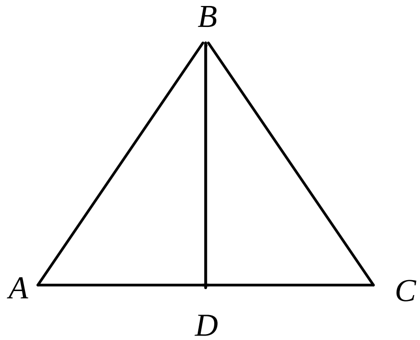
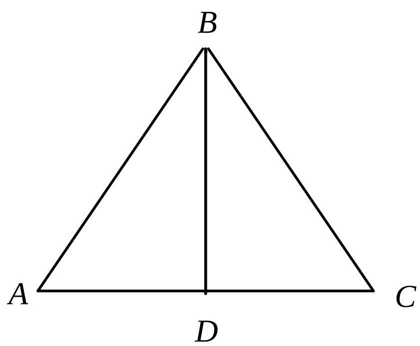
NAME:______________________________

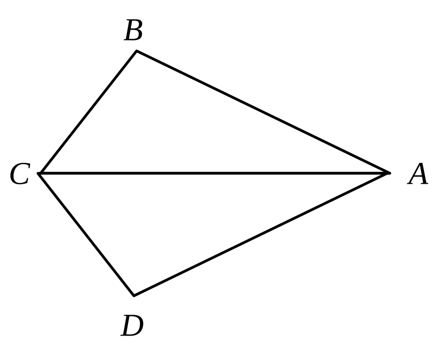
1. Given: $\overline{BD}$ bisects $\overline{AC}$, $\overline{AB} \cong \overline{BC}$
Prove: $\angle C \cong \angle A$



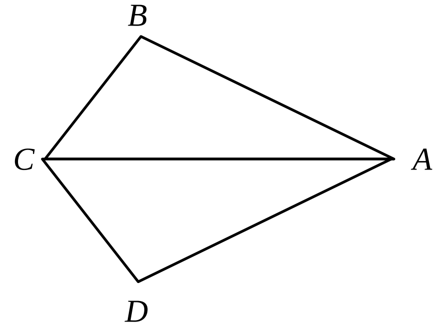
2. Given: $\overline{BD}$ is the median to $\overline{AC}$,
$\overline{AB} \cong \overline{BC}$
Prove: $\angle CBD \cong \angle ABD$



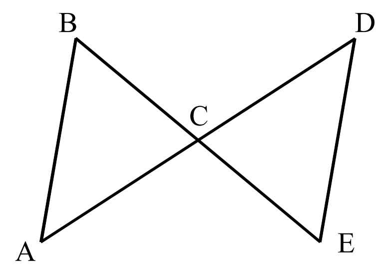
3. Given: $\angle DCA \cong \angle BCA$, $\angle B \cong \angle D$
Prove: $\overline{AB} \cong \overline{AD}$



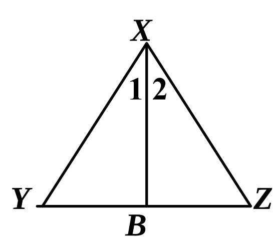
4. Given: $\angle BAC \cong \angle DAC$, $\angle B \cong \angle D$
Prove: $\overline{BC} \cong \overline{DC}$



5. Given: $\overline{BC} \cong \overline{EC}$ and $\overline{AC} \cong \overline{DC}$
Prove: $\overline{BA} \cong \overline{ED}$



6. Write a flow proof of the Isosceles Triangle Theorem.
Given: $\overline{XY} \cong \overline{XZ}$, $\overline{XB}$ bisects $\angle YXZ$
Prove: $\angle Y \cong \angle Z$



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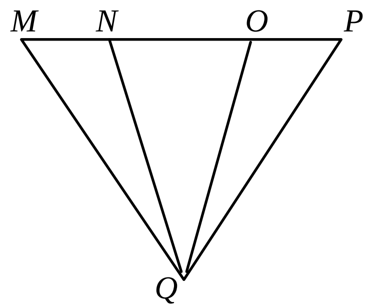
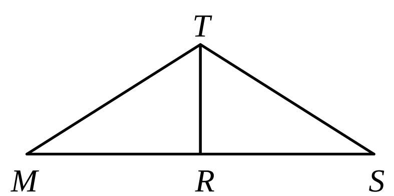
7. Given: $\overline{QO} \cong \overline{QN}$; $\overline{NM} \cong \overline{OP}$
Prove: ΔQMP is isosceles

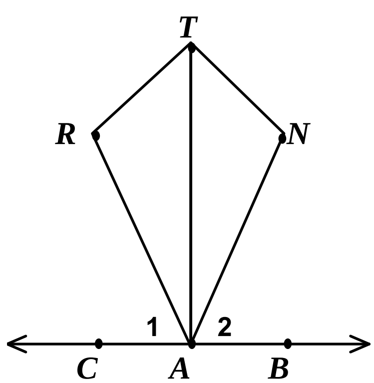


8. Given: R is the midpoint of $\overline{MS}$
$\overline{TR} \perp \overline{MS}$

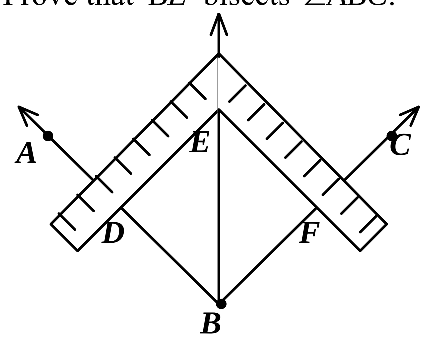
Outline a proof that shows: $\overline{TM} \cong \overline{TS}$



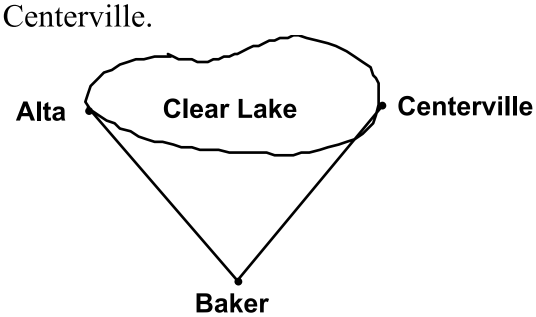
9. Outline a plan for proving that $\overline{RT} \cong \overline{NT}$ if $\overline{AN} \cong \overline{AR}$, $\overline{AT} \perp \overline{CB}$, and $\angle 1 \cong \angle 2$.



10. A carpenter may bisect an angle using a steel square such as follows: Mark off D on $\overrightarrow{BA}$ and F on $\overrightarrow{BC}$ such that $\overline{BD} \cong \overline{BF}$. Then adjust the square so that $\overline{ED} \cong \overline{EF}$ as shown. Prove that $\overline{BE}$ bisects $\angle ABC$.



11. Clear Lake lies between Alta and Centerville. If you know the distance from Baker to Alta and Baker to Centerville, explain how you could use congruent triangles to find the distance across the lake from Alta to Centerville.



12. Point A is on the line $y + 3x = 2$ and is equidistant from points B and C, both of which lie on the line $y = \frac{1}{3}x + 8$. D is on the intersection of both lines. Prove that $y + 3x = 2$ bisects $\overline{BC}$.

[1]

1. $\overline{BD}$ bisects $\overline{AC}$, $\overline{AB} \cong \overline{BC}$	1. Given
2. $\overline{AD} \cong \overline{CD}$	2. Definition of a bisector
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive
4. $\Delta ADB \cong \Delta CDB$	4. SSS
5. $\angle C \cong \angle A$	5. CPCTC

[2]

1. $\overline{BD}$ is the median to $\overline{AC}$, $\overline{AB} \cong \overline{BC}$	1. Given
2. $\overline{AD} \cong \overline{CD}$	2. Definition of a median
3. $\overline{BD} \cong \overline{BD}$	3. Reflexive
4. $\Delta ADB \cong \Delta CDB$	4. SSS
5. $\angle CBD \cong \angle ABD$	5. CPCTC

[3]

1. $\angle DCA \cong \angle BCA$, $\angle B \cong \angle D$	1. Given
2. $\overline{AC} \cong \overline{AC}$	2. Reflexive
3. $\Delta ABC \cong \Delta ADC$	3. AAS
4. $\overline{AB} \cong \overline{AD}$	4. CPCTC

[4]

1. $\angle BAC \cong \angle DAC$, $\angle B \cong \angle D$	1. Given
2. $\overline{AC} \cong \overline{AC}$	2. Reflexive
3. $\Delta ABC \cong \Delta ADC$	3. AAS
4. $\overline{BC} \cong \overline{DC}$	4. CPCTC

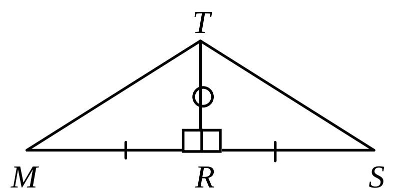
[5]

1. $\overline{BC} \cong \overline{EC}$ $\overline{AC} \cong \overline{DC}$	1. Given
2. $\angle BCA \cong \angle ECD$	2. Vertical Angles
3. $\Delta BCA \cong \Delta ECD$	3. SAS
4. $\overline{BA} \cong \overline{ED}$	4. CPCTC

[6] Check students' work. Include SAS and CPCTC.

[7]

1. $\overline{QN} \cong \overline{QO}$	1. Given
2. $\angle QNO \cong \angle QON$	2. If 2 sides of a Δ are $\cong$, the $\angle$s opp. are $\cong$.
3. $\angle QNM \cong \angle QOP$	3. If $\angle$s are supp. to $\cong$ $\angle$s, they are $\cong$.
4. $\overline{NM} \cong \overline{OP}$	4. Given
5. $\Delta QNM \cong \Delta QOP$	5. SAS
6. $\overline{QM} \cong \overline{QP}$	6. CPCTC
7. ΔQMP is isosceles	7. If at least 2 sides of a Δ are $\cong$, the Δ is isosc.



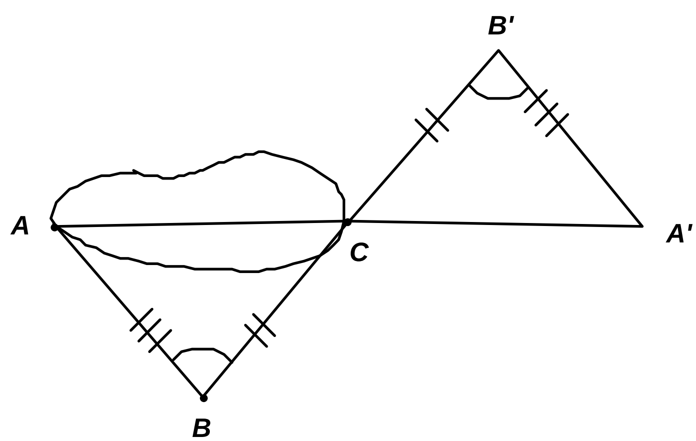
$\Delta TMR \cong \Delta TSR$ by the *SAS* congruency postulate

[8] $\overline{TM} \cong \overline{TS}$ by *CPCTC*

[9] Because $\overline{AT} \perp \overline{CB}$, we know $\angle CAT$ and $\angle BAT$ are right angles and therefore congruent. By the Subtraction Prop., we know $\angle RAT \cong \angle NAT$. $\overline{TA}$ is congruent to itself and $\overline{AN} \cong \overline{AR}$. So, ΔTRA and ΔTNA are congruent by SAS. Thus $\overline{RT} \cong \overline{NT}$ by CPCTC.

[10] Check students' work. They should show that $\Delta DBE \cong \Delta FBE$ by SSS and therefore $\angle DBE \cong \angle FBE$ by CPCTC. Thus the angle is bisected by definition.

[11] Draw another triangle with distances equal to $\overline{AB}$ and $\overline{BC}$ and $\angle B \cong \angle B'$. Measure $\overline{A'C}$. Because the angles are congruent(SAS), $\overline{AC} \cong \overline{A'C}$.



[12] Check students' proofs. They should show that $y + 3x = 2$ is perpendicular to $\overline{BC}$ because its slope (-3) is the negative reciprocal of that of $\overline{BC}$ $\left(\frac{1}{3}\right)$. Then, because *A* is equidistant from *B* and *C*, $\overline{AB} \cong \overline{BC}$. Also, $\overline{AD} \cong \overline{AD}$, so $\Delta ABD \cong \Delta ACD$ by HL. Thus $\overline{BD} \cong \overline{CD}$ and the line bisects $\overline{BC}$.