Name:

Common Core Geometry

Unit 3

Triangle Proofs

Mr. Schlansky

2026

Triangle Proofs:

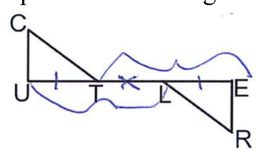
If it is not specified, prove triangles are congruent
To prove triangles are congruent, prove 3 pairs of sides/angles are congruent
To prove segments or angles, use CPCTC
<u>*If you get stuck, make something up and keep on going!</u>

1) Do a mini proof with your givens
Line bisector creates two congruent segments
Midpoint creates two congruent segments
Angle bisector creates two congruent angles
Perpendicular lines create two congruent right angles
Parallel lines cut by a transversal create congruent alternate interior angles
2) Use additional tools:
Vertical Angles are congruent (Look for an X)
Reflexive Property (A side/angle is in both triangles and is congruent to itself)
Isosceles Triangles (In a triangle, congruent angles are opposite congruent sides)
Addition and Subtraction Property (If you need more or less of a shared side)
*You must use three congruent statements to get one congruent statement for the triangles. The two that you are adding/subtracting and the one that you want to prove in the triangle.

7. Given: $\overline{UL} \cong \overline{TE}$
Prove: $\Delta CUT \cong \Delta REL$

statements	Reasons
(1) $\overline{UL} \cong \overline{TE}$	(1) given
(2) $\overline{TL} \cong \overline{TL}$	(2) reflexive property
(3) $\overline{UT} \cong \overline{LE}$	(3) subtraction property

os
$\overline{UL} - \overline{TL} \cong \overline{TE} - \overline{TL}$



To prove a triangle is isosceles:
-Prove the triangles are congruent and then use CPCTC to state two sides/angles of the triangle are congruent.
To prove parallel:
-Prove the triangle are congruent and then use CPCTC to state alternate interior, alternate exterior, or corresponding angles are congruent.

Lesson 1: I can complete mini proofs using my definitions

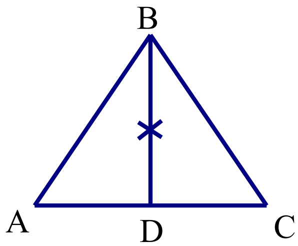
Line bisector creates two congruent segments
Midpoint creates two congruent segments
Angle bisector creates two congruent angles
Perpendicular lines create two congruent right angles
Parallel lines cut by a transversal create congruent alternate interior angles
*Lines that bisect each other are both cut into two congruent segments
*Perpendicular bisector is both perpendicular lines (congruent right angles) and a line bisector (congruent segments)
*You may need to use two perpendicular givens for one conclusion

Lesson 2: I can practice mini proofs using my definitions

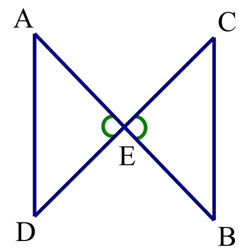
Same notes as Lesson 1

Lesson 3: I can complete mini proofs using vertical angles and reflexive property.
Vertical Angles are congruent (Look for an X)
Reflexive Property (A side/angle is in both triangles and is congruent to itself)

$\overline{BD} \cong \overline{BD}$ Reflexive Property



$\angle AED \cong \angle CEB$ Vertical Angles are Congruent



Lesson 4: I can determine which method proves triangles congruent by marking the sides and angles.

Proves Triangles Congruent	**Does Not Prove Triangles Congruent**
SSS	ASS
SAS	AAA
ASA	
AAS	
Hypotenuse Leg (HL) ASS in a Right Triangle	

The difference between ASA and AAS:
Is the side that's marked the side that's between the two angles?
If the side is between the two angles: ASA
If the side is not between the two angles: AA

Lesson 5: I can prove triangles are congruent by proving three pairs of sides/angles are congruent.
To prove triangles are congruent, prove 3 pairs of sides/angles are congruent

1) Do a mini proof with your givens
Line bisector creates two congruent segments
Midpoint creates two congruent segments
Angle bisector creates two congruent angles
Perpendicular lines create two congruent right angles
Parallel lines cut by a transversal create congruent alternate interior angles
*Lines that bisect each other are both cut into two congruent segments
*Perpendicular bisector is both perpendicular lines (congruent right angles) and a line bisector (congruent segments)
*You may need to use two perpendicular givens for one conclusion

2) Use additional tools:
Vertical Angles are congruent (Look for an X)
Reflexive Property (A side/angle is in both triangles and is congruent to itself)

Lesson 6: I can prove sides/angles are congruent by proving triangles are congruent and using CPCTC.
To prove segments/angles are congruent:
1) Prove the triangles are congruent using the steps from Lesson 5.
2) State the segments/angles are congruent with reason "CPCTC" (Corresponding Parts of Congruent Triangles are Congruent).

Lesson 7: I can prove a triangle is isosceles by proving triangles are congruent and using CPCTC to prove two congruent sides/angles are congruent (Mini Proofs).
1) Prove triangles are congruent using the steps from Lesson 6.
2) Use CPCTC to prove a pair of sides/angles are congruent in the triangle you are trying to prove.
3) State the triangle is isosceles using reason "Isosceles Triangle Theorem" (In an isosceles triangle, congruent sides are opposite congruent angles.

Lesson 8: I can prove lines are parallel by proving triangles are congruent and using CPCTC to prove alternate interior, alternate exterior, or corresponding angles congruent. (Mini Proofs)
1) Prove triangles are congruent using the steps from Lesson 6.
2) Use CPCTC to prove a pair of alternate interior/alternate exterior/corresponding angles are congruent.
3) State the lines are parallel with reason "Parallel lines cut by a transversal create congruent alternate interior/alternate exterior/corresponding angles"

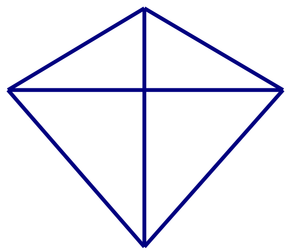
Lesson 9: I can prove triangles are isosceles, lines are parallel, and midpoint/bisector by using CPCTC to prove sides/angles are congruent.
PROVE TRIANGLES CONGRUENT
To prove midpoint/bisector:
Use CPCTC to state the appropriate sides/angles are congruent and then state the midpoint bisector
To prove isosceles:
Use CPCTC to state two sides/angles of the triangle are congruent and then state the triangle is isosceles
To prove parallel:
Use CPCTC to state that alternate interior, alternate exterior, or corresponding angles are congruent and then state the lines are parallel.
*Use the notes from lessons 8 and 9.

Lesson 10: I can answer perpendicular bisector multiple choice questions by understanding that the two top triangles are congruent, the top bottom triangles are congruent, and the big top triangle and the big bottom triangle are both isosceles.

Perpendicular bisector creates

-two pairs of congruent triangles so all of their corresponding parts are congruent due to CPCTC

-two isosceles triangles



The top 2 small triangles are congruent and the top big triangle is isosceles

The bottom 2 small triangles are congruent and the bottom big triangle is isosceles

Lesson 11: I can complete an isosceles triangle theorem mini proof using "In a triangle, congruent angles are opposite congruent sides.

If given sides/angles are not in the triangles you're trying to prove, look to see if it creates an isosceles triangle. If so, state the opposite sides/angles are congruent (that are in the triangles you're trying to prove with reason "Isosceles Triangle Theorem."

Lesson 12: I can complete an addition/subtraction property mini proof by following its procedure.

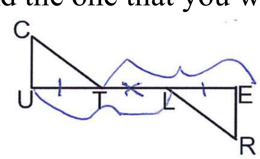
Addition and Subtraction Property (If you need more or less of a shared side)

*You must use three congruent statements to get one congruent statement for the triangles. The two that you are adding/subtracting and the one that you want to prove in the triangle.

7. Given: $\overline{UL} \cong \overline{TE}$

Prove: $\triangle CUT \cong \triangle REL$

statements	reasons
① $\overline{UL} \cong \overline{TE}$	① given
② $\overline{TL} \cong \overline{TL}$	② reflexive property
③ $\overline{UT} \cong \overline{LE}$	③ subtraction property
$\overline{UL}-\overline{TL} \cong \overline{TE}-\overline{TL}$	



Lesson 13: I can complete triangle proofs with additional tools by doing mini proofs with my givens and then using additional tools VRIAS.

Use the notes from the very front of the packet.

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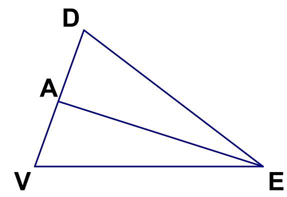
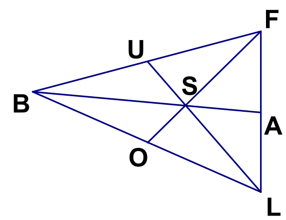
Mini Proofs

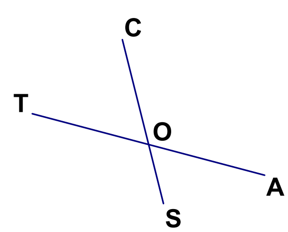
1. Given: A is the midpoint of $\overline{DV}$



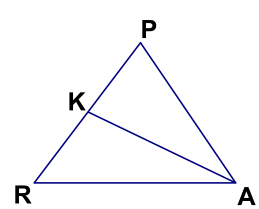
2. Given: U is the midpoint of $\overline{BF}$



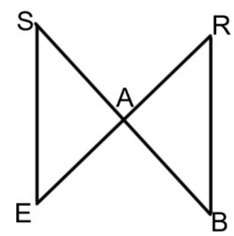
3. Given: $\overline{CS}$ bisects $\overline{TA}$



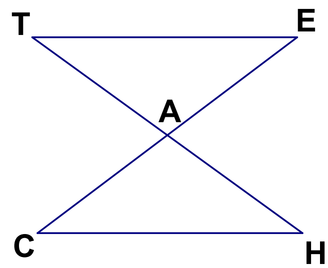
4. Given: $\overline{KA}$ bisects $\overline{PR}$



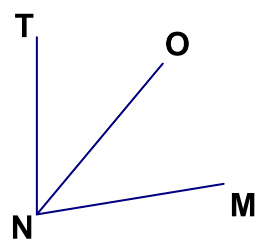
5. Given: $\overline{SB}$ and $\overline{RE}$ bisect each other



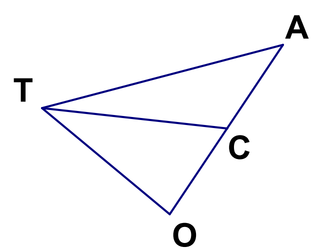
6. Given: $\overline{TH}$ and $\overline{CE}$ bisect each other



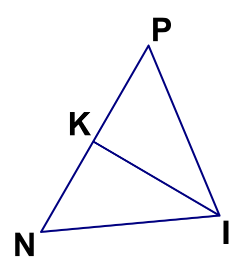
7. Given: $\overline{ON}$ bisects $\angle$ TNM



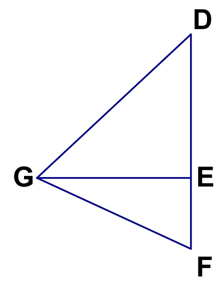
8. Given: $\overline{CT}$ bisects $\angle$ ATO



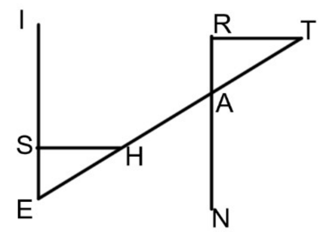
9. Given: $\overline{IK} \perp \overline{PN}$



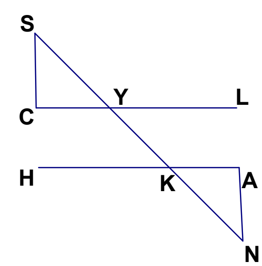
10. Given: $\overline{GE} \perp \overline{DF}$



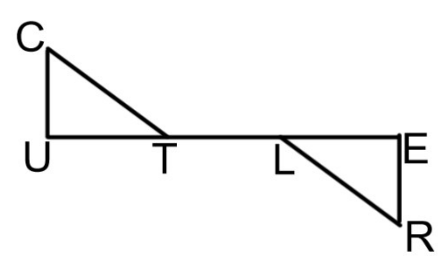
11. Given: $\overline{IE} \perp \overline{SH}$, $\overline{RN} \perp \overline{RT}$



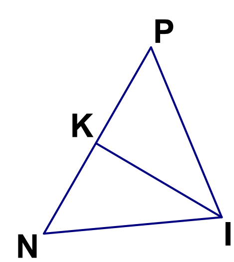
12. Given: $\overline{CL} \perp \overline{CS}$, $\overline{HA} \perp \overline{AN}$



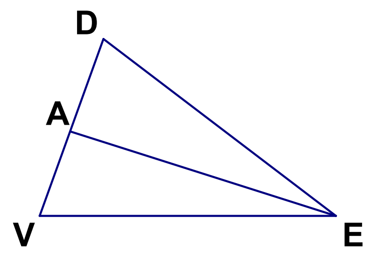
13. Given: $\overline{CU} \perp \overline{UE}$, $\overline{RE} \perp \overline{UE}$



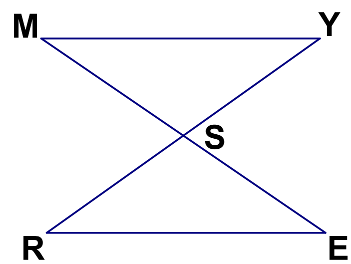
14. $\overline{IK}$ is the perpendicular bisector of $\overline{NP}$



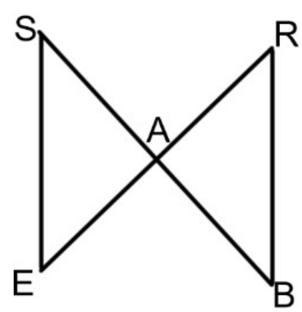
15. $\overline{EA}$ is the perpendicular bisector of $\overline{DV}$



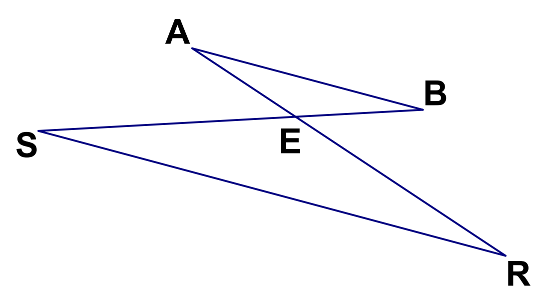
16. Given: $\overline{MY} \parallel \overline{RE}$



17. Given: $\overline{SE} \parallel \overline{RB}$



18. Given: $\overline{SR} \parallel \overline{AB}$



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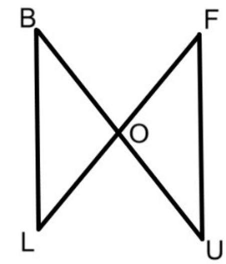
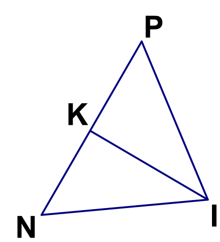
Date __________
Geometry

Mini Proofs Practice

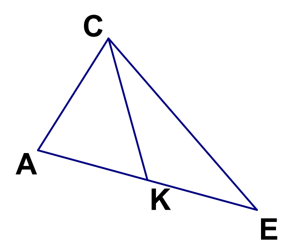
1. Given: $\overline{BL} || \overline{FU}$



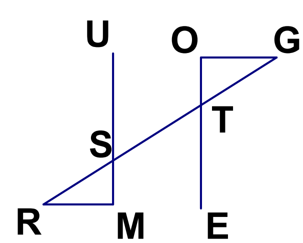
2. Given: $\overline{IK} \perp \overline{PN}$



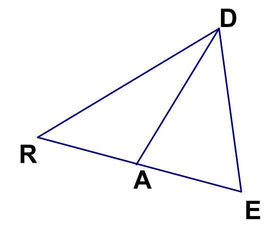
3. $\overline{CK}$ bisects $\overline{AE}$



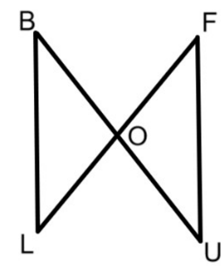
4. Given: $\overline{MR} \perp \overline{MU}, \overline{EO} \perp \overline{OG}$



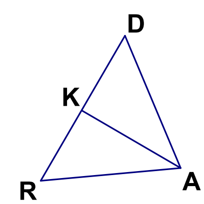
5. $\overline{DA}$ bisects $\angle$ RDE



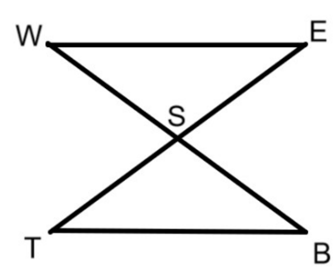
6. Given: $\overline{BL}$ and $\overline{FU}$ bisect each other



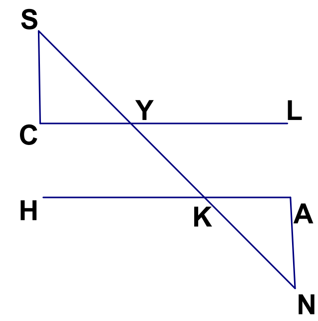
7. Given: $\overline{AK}$ is the perpendicular bisector of $\overline{DR}$



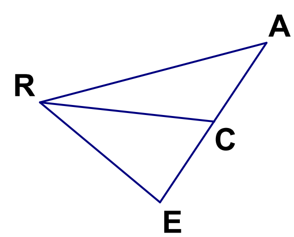
8. Given: $\overline{WE} || \overline{TB}$



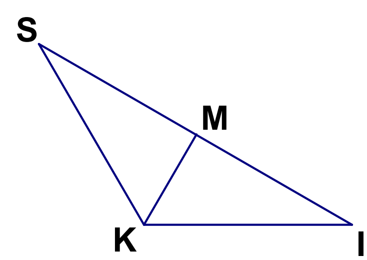
9. Given: $\overline{SC} \perp \overline{CL}$, $\overline{NA} \perp \overline{AH}$



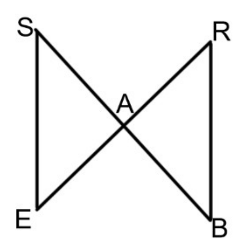
10. Given: C is the midpoint of $\overline{AE}$



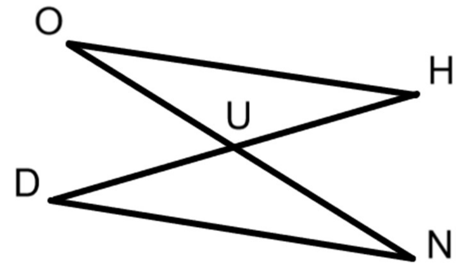
11. Given: $\overline{KM}$ is the perpendicular bisector of $\overline{SI}$



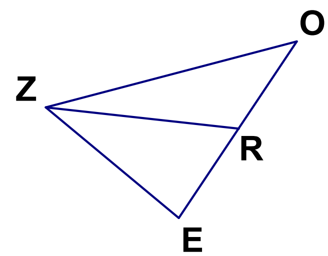
12. Given: $\overline{SB}$ and $\overline{RE}$ bisect each other



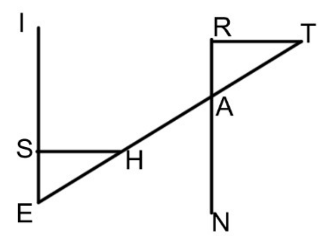
13. Given: $\overline{OH} || \overline{DN}$



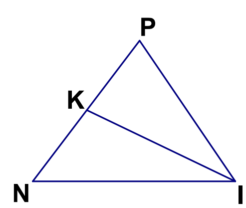
14. Given: R is the midpoint of $\overline{OE}$



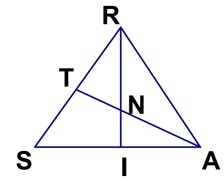
15. Given: $\overline{TR} \perp \overline{RA}, \overline{IE} \perp \overline{SH}$



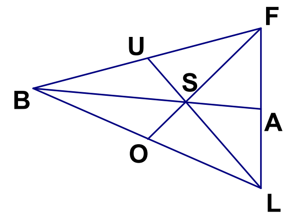
16. Given: $\overline{KI}$ bisects $\angle$ PIN



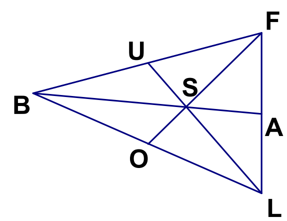
17. Given: $\overline{AT} \perp \overline{RS}$



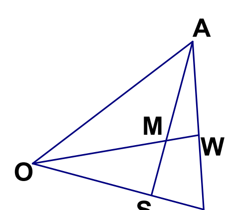
18. Given: U is the midpoint of $\overline{BF}$



19. Given: $\overline{AB}$ bisects $\angle$ FBL



20. Given: $\overline{AS} \perp \overline{OE}$



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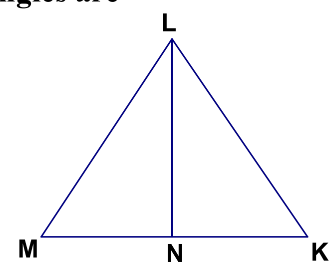
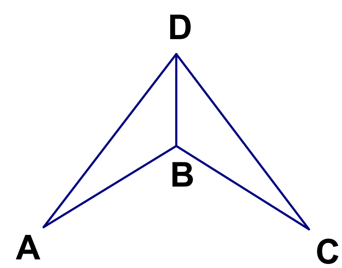
Reflexive Property and Vertical Angles

List one statement and reason that leads towards proving the triangles are congruent/similar

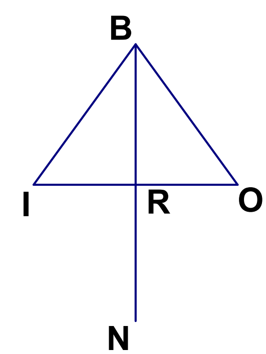
1. Given: None
   Prove: $\Delta LNM \cong \Delta LNK$



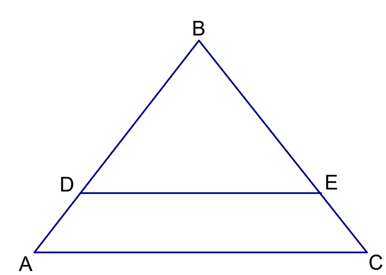
2. Given: None
   Prove: $\Delta DBA \cong \Delta DBC$



3. Given: None
   Prove: $\Delta BRI \cong \Delta BRO$

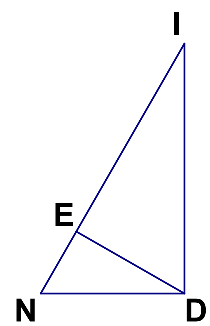


4. Given: None
   Prove: $\Delta BDE \sim \Delta BAC$

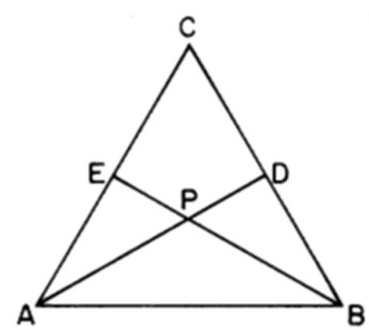


5. Given: None
Prove: $\Delta ABC \sim \Delta ADE$

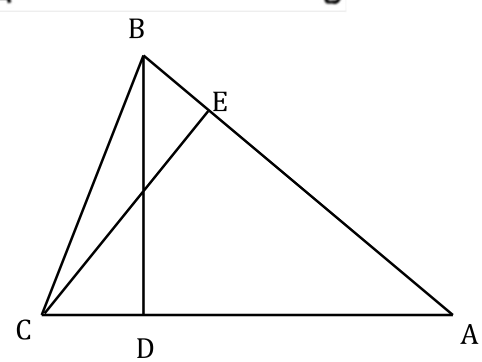
6. Given: None
Prove: $\Delta END \sim \Delta DNI$



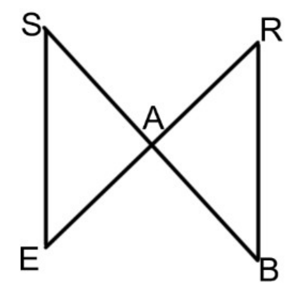
7. Given: None
Prove: $\Delta AEB \cong \Delta BDA$



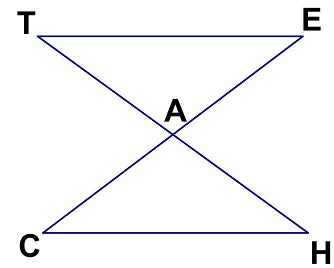
8. Given: None
Prove: $\Delta BEC \cong \Delta CDB$



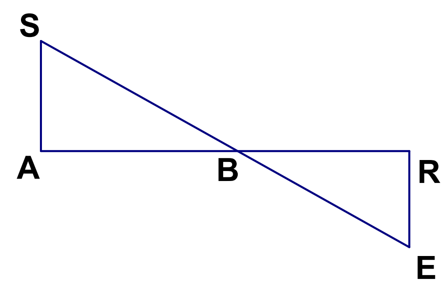
9. Given: None
Prove: $\Delta SAE \cong \Delta RAB$



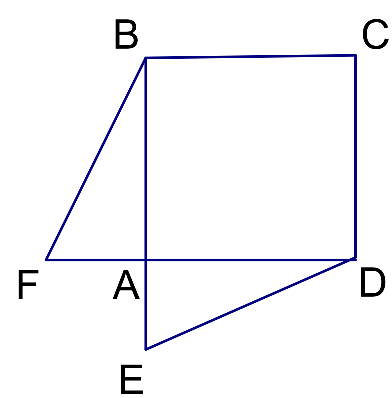
10. Given: None
Prove: $\Delta TAE \cong \Delta CAH$



11. Given: None
Prove: $\Delta SBA \cong \Delta EBR$



12. Given: None
Prove: $\Delta BAF \cong \Delta DAE$



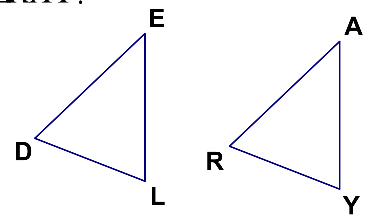
Name _______________ Date ___________

Mr. Schlansky Geometry

Congruent Triangle Methods

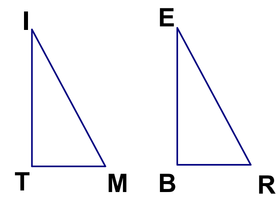
1. In the diagram below of ΔDEL and ΔRAY, $\angle D \cong \angle R$, $\angle E \cong \angle A$, and $\overline{EL} \cong \overline{AY}$
   Which of the follow could be used to prove that $\Delta DEL \cong \Delta RAY$?

(1) ASA (3) AAS
(2) AA (4) SAS



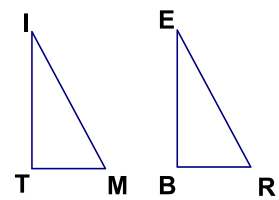
2. In the diagram below of ΔTIM and ΔBER, $\angle T$ *and* $\angle B$ are right angles, $\overline{IM} \cong \overline{ER}$, and $\overline{TM} \cong \overline{BR}$
   Which of the follow could be used to prove that $\Delta TIM \cong \Delta BER$?

(1) ASS (3) HL
(2) AA (4) SAS



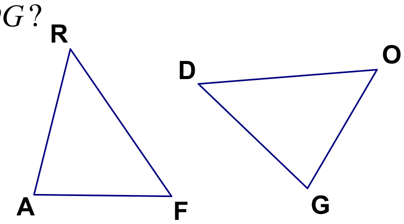
3. In the diagram below of ΔTIM and ΔBER, $\angle T$ *and* $\angle B$ are right angles, $\overline{IT} \cong \overline{EB}$, and $\overline{TM} \cong \overline{BR}$
   Which of the follow could be used to prove that $\Delta TIM \cong \Delta BER$?

(1) ASS (3) HL
(2) AA (4) SAS



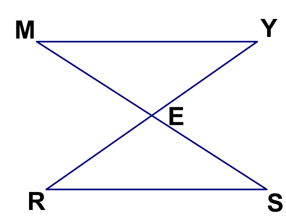
4. In the diagram below of ΔARF and ΔDOG, $\overline{GD} \cong \overline{AR}$, $\overline{RF} \cong \overline{DO}$, and $\angle D \cong \angle R$
   Which of the follow could be used to prove that $\Delta ARF \cong \Delta DOG$?

(1) AAS (3) HL
(2) ASA (4) SAS



5. In the diagram below, $\overline{ME} \cong \overline{ES}$, $\angle MEY \cong \angle SER$, and $\angle M \cong \angle S$
   Which of the follow could be used to prove that $\Delta MEY \cong \Delta SER$?

(1) AAS (3) HL
(2) ASA (4) SAS



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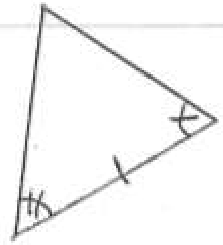

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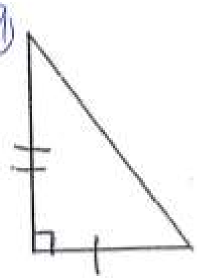

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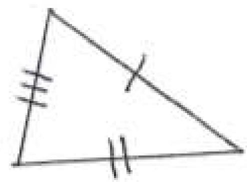
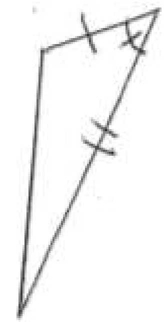
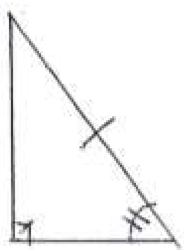


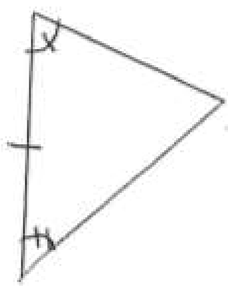
11



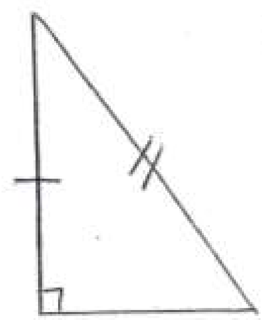
12



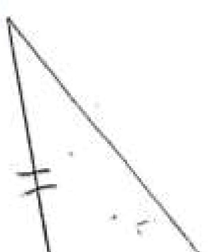
13



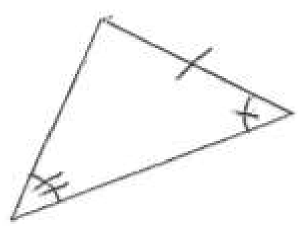
14



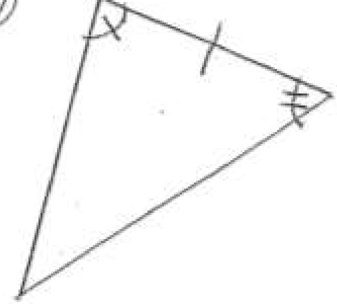
15



16



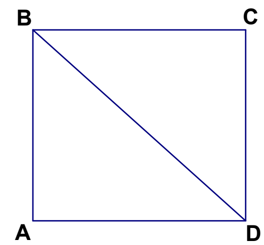
17



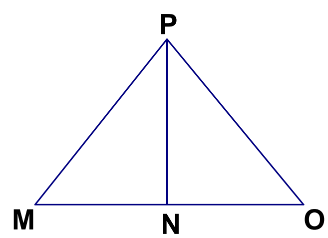
Name _______________ Date _________
Mr. Schlansky Geometry

Triangle Proofs!

1. Given: $\overline{BD}$ bisects $\angle CDA$
$\overline{AD} \cong \overline{DC}$
Prove: $\Delta BAD \cong \Delta BCD$

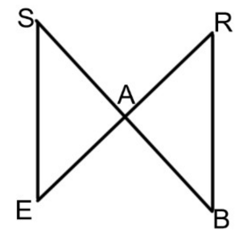


2. Given: $\overline{PN} \perp \overline{MO}$
$\angle OPN \cong \angle MPN$
Prove: $\Delta MPN \cong \Delta OPN$



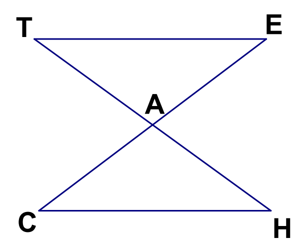
3. Given: $\overline{SE} \parallel \overline{RB}$ and $\overline{RE}$ bisects $\overline{SB}$

Prove: $\Delta ESA \cong \Delta RBA$



4. Given: $\overline{TH}$ *and* $\overline{CE}$ bisect each other at A

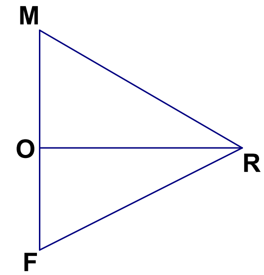
Prove: $\Delta TAE \cong \Delta CAH$



5. Given: $\overline{RO} \perp \overline{MF}$

O is the midpoint of $\overline{MF}$

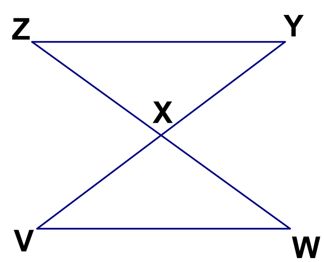
Prove: $\Delta MOR \cong \Delta FOR$



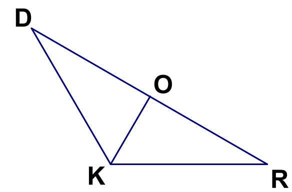
6. Given: X is midpoint of $\overline{WZ}$

$\overline{ZY} || \overline{VW}$

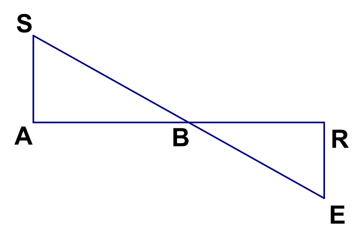
Prove: $\Delta WXV \cong \Delta ZXY$



7. Given: $\overline{KO}$ is the perpendicular bisector of $\overline{DR}$
Prove: $\Delta ROK \cong \Delta DOK$



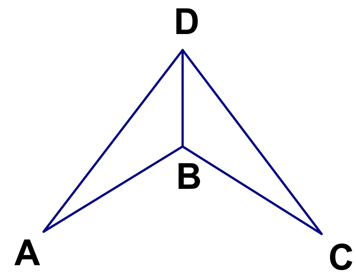
8. Given: $\overline{SA} \perp \overline{AR}$, $\overline{AR} \perp \overline{RE}$, B is the midpoint of $\overline{AR}$
Prove: $\Delta SAB \cong \Delta ERB$



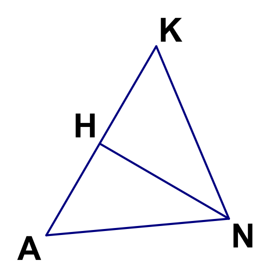
Name _______________ Date _________
Mr. Schlansky Geometry

Triangle Proofs with CPCTC

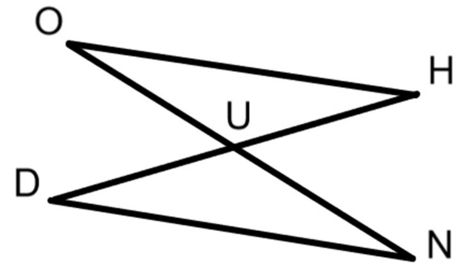
1. Given: $\overline{BD}$ bisects $\angle$ ADC
$\overline{AD} \cong \overline{DC}$
Prove: $\overline{AB} \cong \overline{BC}$



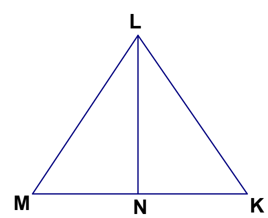
2. Given: $\overline{HN} \perp \overline{KA}$, $\overline{KN} \cong \overline{AN}$
Prove: $\angle HAN \cong \angle HKN$



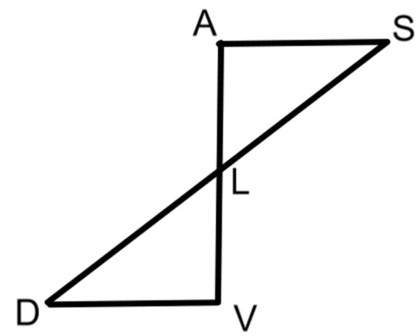
3. Given: $\overline{OH} || \overline{DN}$, $\overline{OH} \cong \overline{DN}$
Prove: $\overline{OU} \cong \overline{UN}$



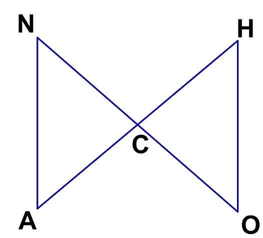
4. Given: $\overline{LN}$ is the perpendicular bisector of $\overline{MK}$
Prove: $\overline{NM} \cong \overline{NK}$



5. Given: $\overline{SA} \perp \overline{AV}$, $\overline{DV} \perp \overline{VA}$, L is the midpoint of $\overline{DS}$
Prove: $\angle$ASL $\cong$ $\angle$VDL

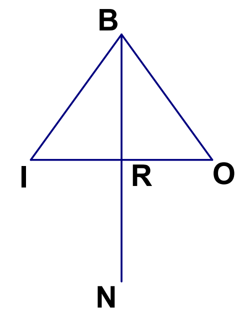


6. Given: $\overline{NO}$ and $\overline{HA}$ bisect each other
Prove: $\overline{NA} \cong \overline{HO}$



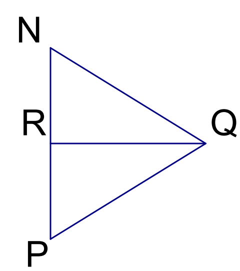
7. Given: $\overline{NB}$ bisects $\angle$ IBO, $\overline{BR} \perp \overline{IO}$

Prove: $\angle$ BIO $\cong$ $\angle$ BOI



8. Given: $\overline{QR}$ is the perpendicular bisector of $\overline{NP}$

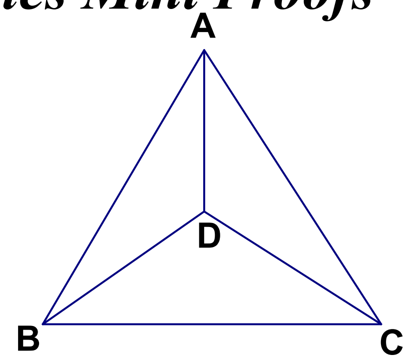
Prove: $\angle NQR \cong \angle PQR$



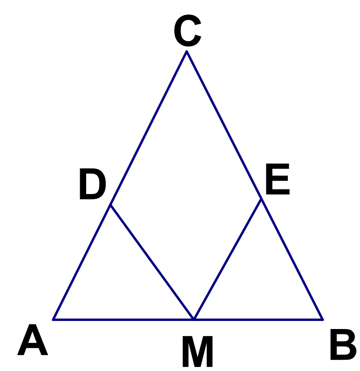
Name _______________ Date _____________
Mr. Schlansky Geometry

Proving Triangles Isosceles Mini Proofs

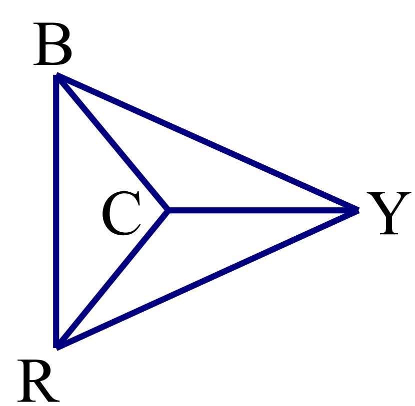
1. Given: $\Delta ADB \cong \Delta ADC$
   Prove: ΔBAC is isosceles



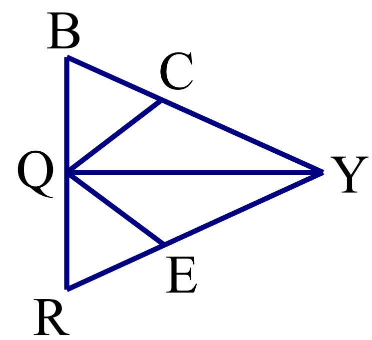
2. Given: $\Delta ADM \cong \Delta BEM$
   Prove: ΔACB is isosceles



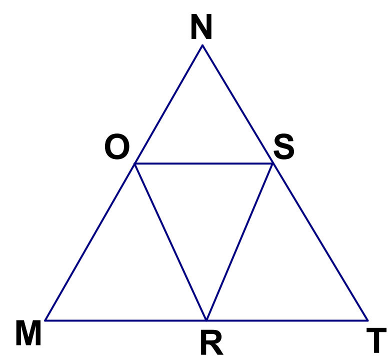
3. Given: $\Delta YCB \cong \Delta YCR$
   Prove: ΔBYR is isosceles



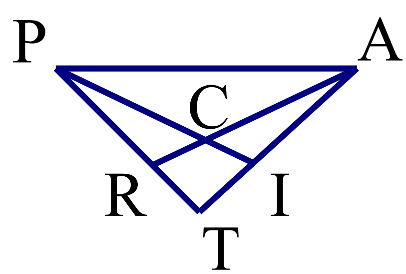
4. Given: $\Delta BQC \cong \Delta RQE$
   Prove: ΔBYR is isosceles



5. Given: $\Delta MOR \cong \Delta TSR$
   Prove: ΔMNT is isosceles



6. Given: $\Delta PRA \cong \Delta AIP$
   Prove: ΔPTA is isosceles

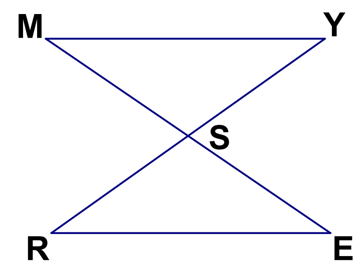


Name _______________ Date ___________

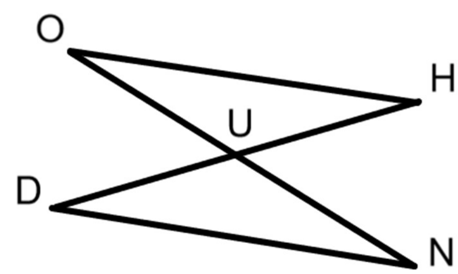
Mr. Schlansky Geometry

Proving Parallel Mini Proofs

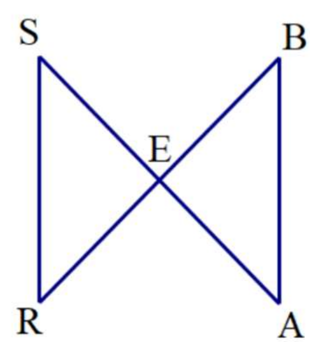
1. Given: $\Delta MYS \cong \Delta ERS$
Prove: $\overline{MY} \parallel \overline{RE}$



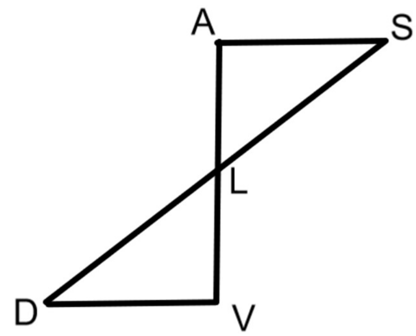
2. Given: $\Delta OHU \cong \Delta NDU$
Prove: $\overline{OH} \parallel \overline{DN}$



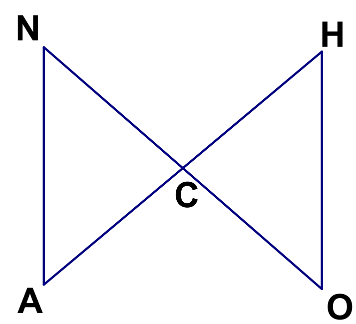
3. Given: $\Delta SRE \cong \Delta ABE$
Prove: $\overline{SR} \parallel \overline{BA}$



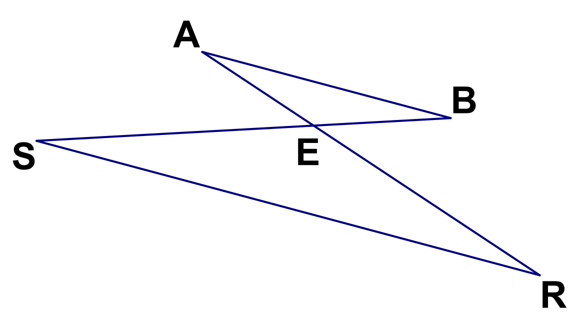
4. Given: $\Delta SAL \cong \Delta DVL$
Prove: $\overline{DV} || \overline{AS}$



5. Given: $\Delta NCA \cong \Delta OCH$
Prove: $\overline{NA} || \overline{HO}$



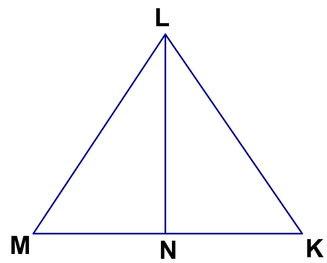
6. Given: $\Delta ABE \cong \Delta RSE$
Prove: $\overline{SR} || \overline{AB}$



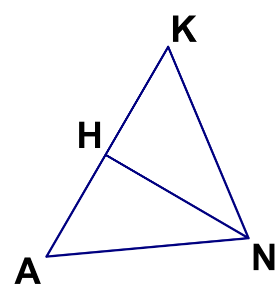
Name _____________ Date __________
Mr. Schlansky Geometry

Triangle Proofs Using CPCTC

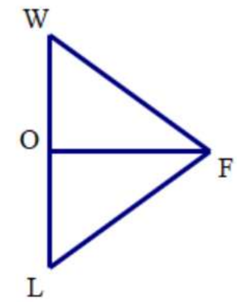
1. Given: $\overline{LN}$ bisects $\angle$ KLM
$\angle$ LKM $\cong$ $\angle$ LMK
Prove: N is the midpoint of $\overline{MK}$



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



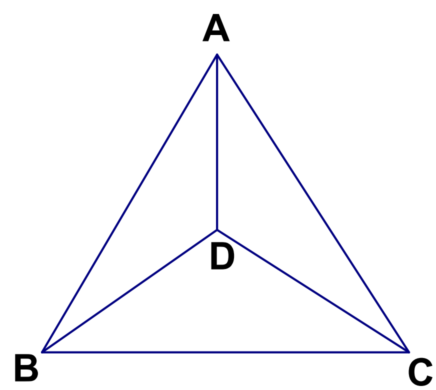
3. Given: $\overline{OF}$ is the perpendicular bisector of $\overline{WL}$
Prove: ΔWFL is isosceles



4. Given: $\angle ADB \cong \angle ADC$

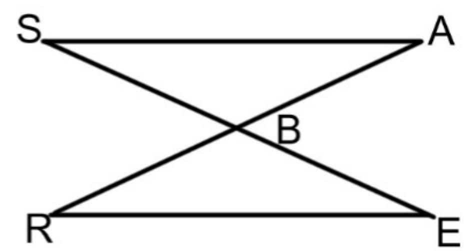
$\overline{AD}$ bisects $\angle BAC$

Prove: ΔABC is isosceles

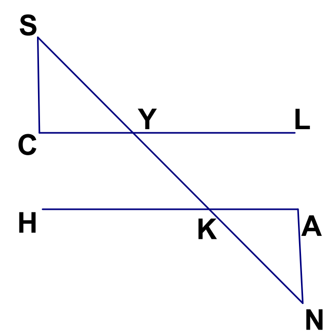


5. Given: $\overline{SE}$ and $\overline{AR}$ bisect each other.

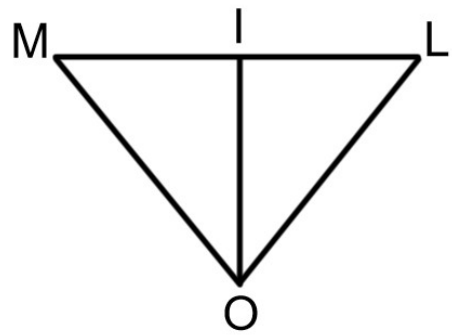
Prove that $\overline{SA} \parallel \overline{RE}$



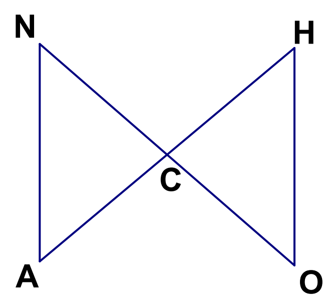
6. Given: $\overline{SC} \perp \overline{CL}$, $\overline{HA} \perp \overline{AN}$, $\overline{SY} \cong \overline{KN}$, and $\overline{SC} \cong \overline{AN}$.
Prove $\overline{CL} \parallel \overline{HA}$



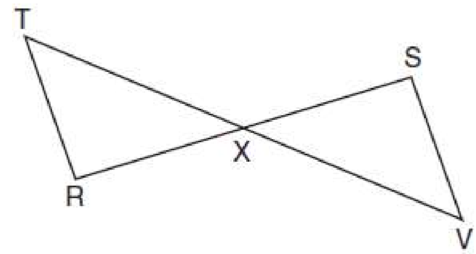
7. Given: $\overline{OI}$ is the perpendicular bisector of $\overline{ML}$
Prove: ΔMLO is isosceles



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

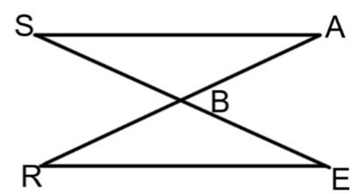


9. Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn
Prove: $\overline{TR} \parallel \overline{SV}$

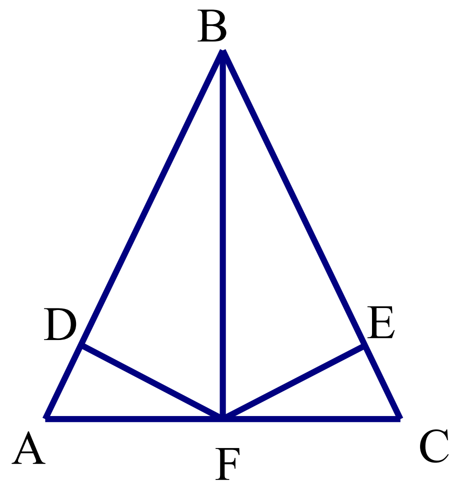


10. Given: $\overline{SE}$ and $\overline{RA}$ bisect each other

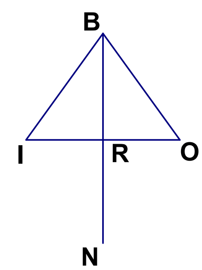
Prove: $\overline{SA} \parallel \overline{RE}$.



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: ΔABC is isosceles



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



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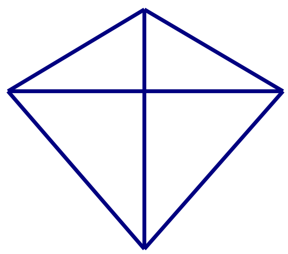
Perpendicular Bisector Multiple Choice

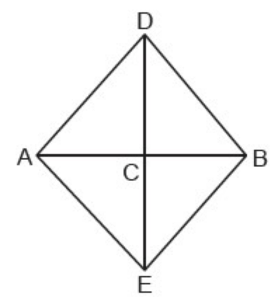
Perpendicular bisector creates
-two pairs of congruent triangles so all of their corresponding parts are congruent due to CPCTC
-two isosceles triangles



The top 2 small triangles are congruent and the top big triangle is isosceles
The bottom 2 small triangles are congruent and the bottom big triangle is isosceles

1. In the diagram below of quadrilateral *ADBE*, $\overline{DE}$ is the perpendicular bisector of $\overline{AB}$.
Which statement is always true?

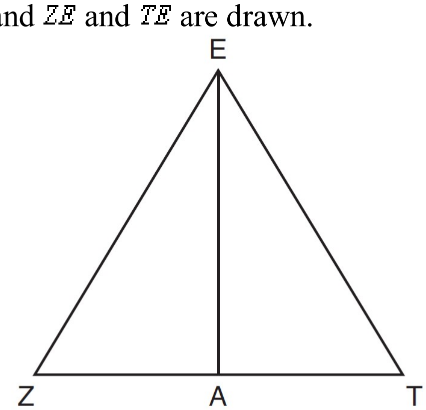
1) $\angle ADC \cong \angle BDC$
2) $\angle EAC \cong \angle DAC$
3) $\overline{AD} \cong \overline{BE}$
4) $\overline{AE} \cong \overline{AD}$



2. Line segment *EA* is the perpendicular bisector of $\overline{ZT}$, and $\overline{ZE}$ and $\overline{TE}$ are drawn.

Which conclusion can *not* be proven?

1) $\overline{EA}$ bisects angle *ZET*.
2) Triangle *EZT* is equilateral.
3) $\overline{EA}$ is a median of triangle *EZT*.
4) Angle *Z* is congruent to angle *T*.



3. Segment *CD* is the perpendicular bisector of $\overline{AB}$ at *E*. Which pair of segments does *not* have to be congruent?

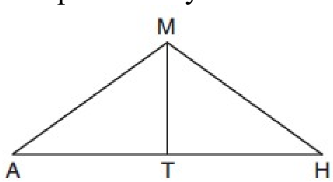
1) $\overline{AD}, \overline{BD}$
2) $\overline{AC}, \overline{BC}$
3) $\overline{AE}, \overline{BE}$
4) $\overline{DE}, \overline{CE}$

4. In $\triangle ABC$, $\overline{BD}$ is the perpendicular bisector of $\overline{ADC}$. Based upon this information, which statements below can be proven?

I. $\overline{BD}$ is a median.
II. $\overline{BD}$ bisects $\angle ABC$.
III. $\triangle ABC$ is isosceles.

1) I and II, only
2) I and III, only
3) II and III, only
4) I, II, and III

5. In triangle *MAH* below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.
Which statement is *not* always true?
1) $\triangle MAH$ is isosceles. 2) $\triangle MAT$ is isosceles. 3) $\overline{MT}$ bisects $\angle AMH$. 4) $\angle A$ and $\angle TMH$ are complementary.



6. Segment *AB* is the perpendicular bisector of $\overline{CD}$ at point *M*. Which statement is always true?

1) $\overline{CB} \cong \overline{DB}$
2) $\overline{CD} \cong \overline{AB}$
3) $\Delta ACD \cong \Delta BCD$
4) $\Delta ACM \cong \Delta BCM$

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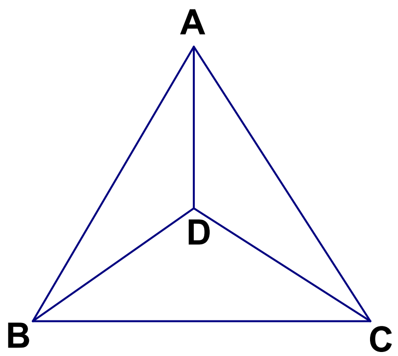
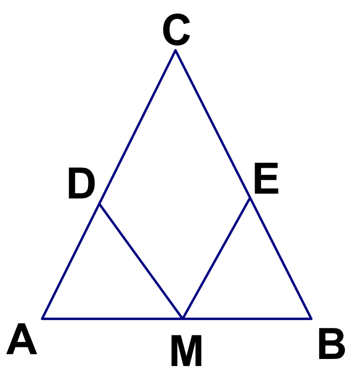
Isosceles Triangle Theorem Mini Proofs

1. Given: $\angle ABC \cong \angle ACB$
   Prove: $\Delta ADB \cong \Delta ADC$

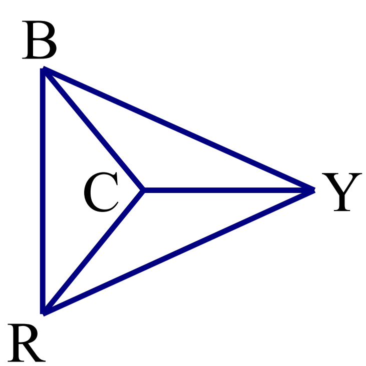


2. Given: $\overline{CA} \cong \overline{CB}$

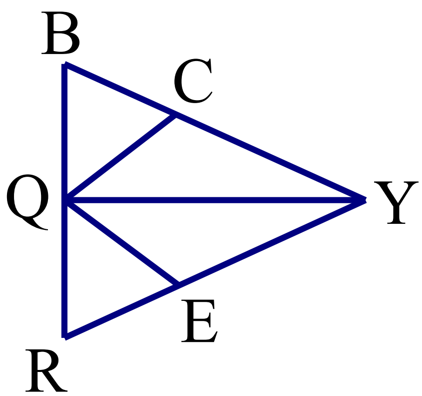
   Prove: $\Delta ADM \cong \Delta BEM$



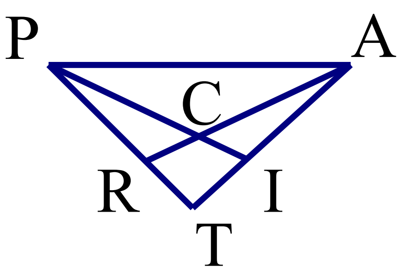
3. Given: $\angle BRY \cong \angle YRB$
   Prove: $\Delta YCB \cong \Delta YCR$



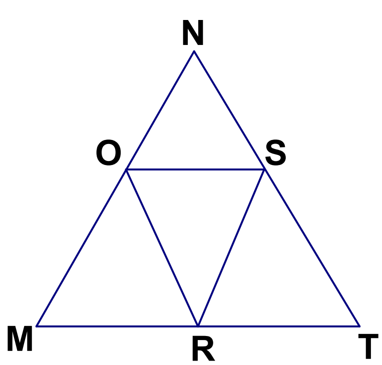
4. Given: $\overline{BY} \cong \overline{RY}$
   Prove: $\Delta BQC \cong \Delta RQE$



5. Given: $\overline{PT} \cong \overline{AT}$
   Prove: $\Delta PRA \cong \Delta AIP$



6. Given: $\overline{MN} \cong \overline{NT}$, $\angle ROS \cong \angle RSO$
   Prove: $\Delta MOR \cong \Delta TSR$



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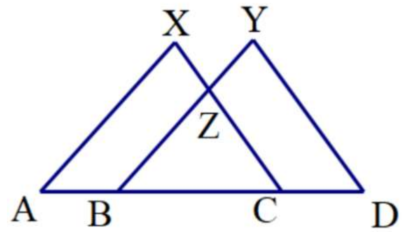
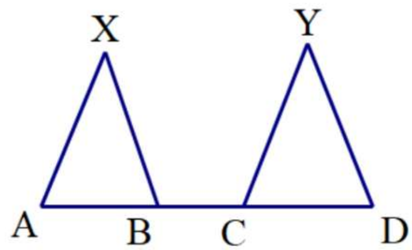
Addition and Subtraction Property Mini Proofs

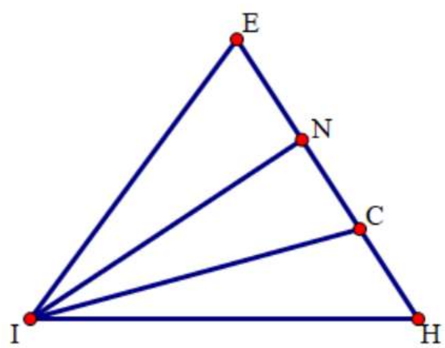
1. Given: $\overline{AB} \cong \overline{CD}$
Prove: $\Delta AXC \cong \Delta BYD$



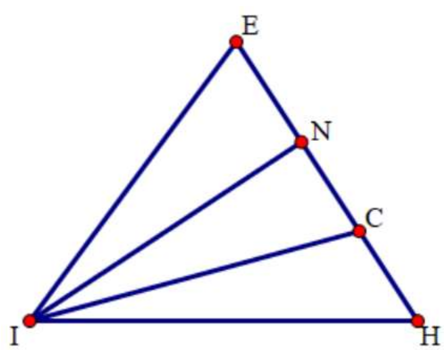
2. Given: $\overline{AC} \cong \overline{BD}$
Prove: $\Delta AXB \cong \Delta DYC$



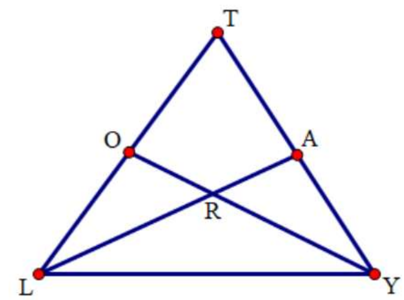
3. Given: $\angle EIN \cong \angle HIC$
Prove: $\Delta EIC \cong \Delta HIN$



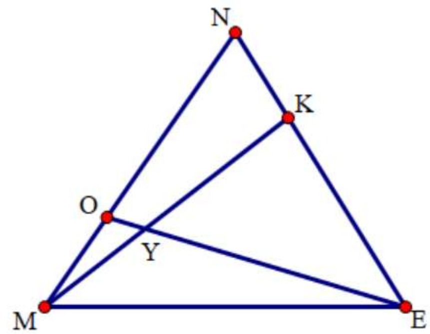
4. Given: $\angle EIC \cong \angle HIN$
Prove: $\Delta EIN \cong \Delta HIC$



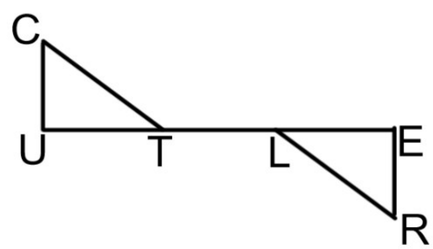
5. Given: $\angle TLA \cong \angle TYO$, $\angle ALY \cong \angle OYL$
Prove: $\Delta OLY \cong \Delta AYL$



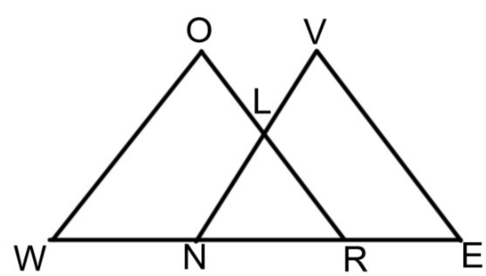
6. Given: $\overline{MN} \cong \overline{NE}$, $\overline{ON} \cong \overline{KE}$
Prove: $\Delta MOE \cong \Delta NKM$



7. Given: $\overline{UL} \cong \overline{TE}$
Prove: $\Delta CUT \cong \Delta REL$



8. Given: $\overline{WN} \cong \overline{RE}$
Prove: $\Delta WOR \cong \Delta NVE$



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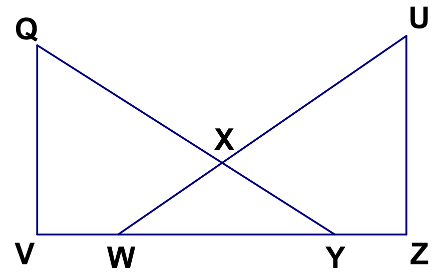
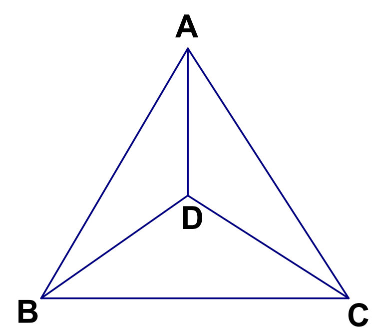
Triangle Proofs with Additional Tools

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



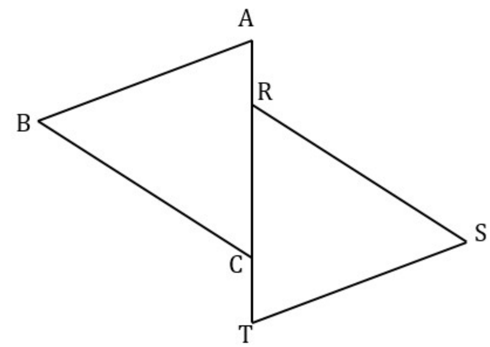
2. Given: $\angle ABC \cong \angle ACB$, $\overline{AD}$ bisects $\angle BAC$

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

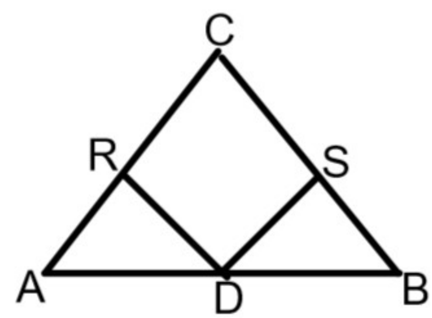


3. Given: $\angle B \cong \angle S$, $\overline{AB} \parallel \overline{ST}$, $\overline{AR} \cong \overline{TC}$

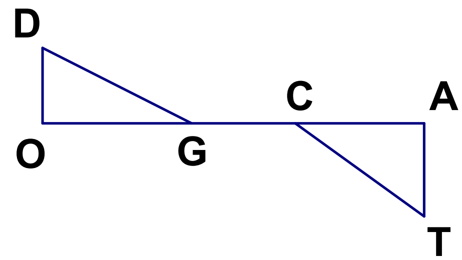
Prove: $\overline{BC} \cong \overline{SR}$



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

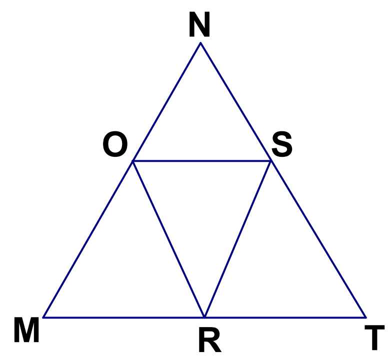


5. Given: $\overline{DO} \perp \overline{OA}$, $\overline{TA} \perp \overline{OA}$, $\overline{DO} \cong \overline{TA}, \overline{OC} \cong \overline{AG}$
Prove: $\overline{DG} \cong \overline{TC}$



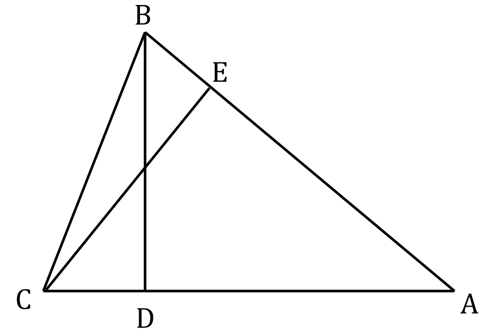
6. Given: $\overline{MN} \cong \overline{NT}$, $\angle ROS \cong \angle RSO$, $\angle ORM \cong \angle SRT$

Prove: $\Delta MOR \cong \Delta TSR$



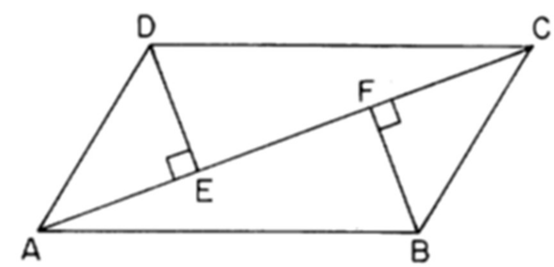
7. Given: $\overline{AB} \cong \overline{AC}, \overline{CE} \perp \overline{AB}, \overline{BD} \perp \overline{AC}$

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



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

Prove: $\Delta ABF \cong \Delta CDE$



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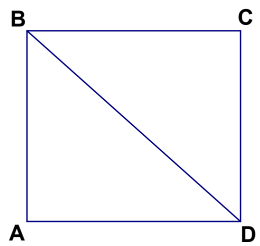
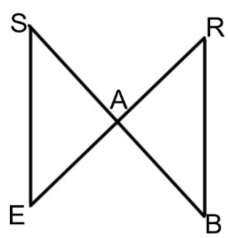
Triangle Proofs Practice

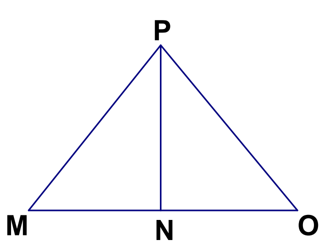
1. Given: $\overline{BD}$ bisects $\angle CDA$
$\overline{AD} \cong \overline{DC}$
Prove: $\overline{BA} \cong \overline{BC}$



2. Given: $\overline{SB}$ and $\overline{RE}$ bisect each other
Prove: $\overline{SE} \cong \overline{RB}$



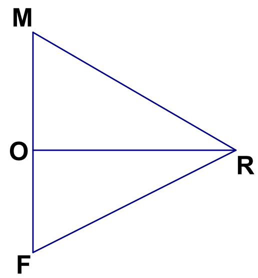
3. Given: $\overline{PN} \perp \overline{MO}$
$\overline{PM} \cong \overline{PO}$
Prove: $\angle PMN \cong \angle PON$



4. Given: $\overline{OR}$ bisects $\angle FRM$

$\angle F \cong \angle M$

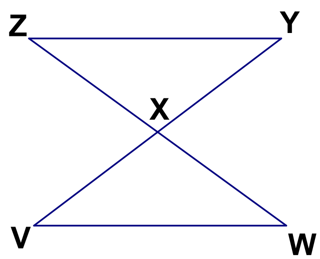
Prove: $\Delta MOR \cong \Delta FOR$



5. Given: X is midpoint of $\overline{WZ}$

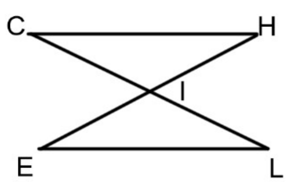
$\angle W \cong \angle Z$

Prove: $\angle V \cong \angle Y$

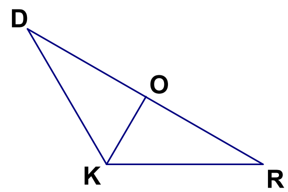


6. Given: $\overline{CH} \parallel \overline{LE}$ and $\overline{CH} \cong \overline{LE}$

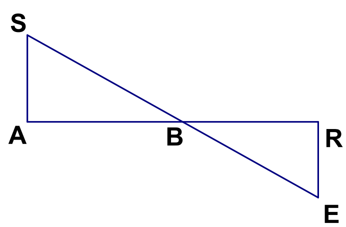
Prove $\overline{CI} \cong \overline{IL}$



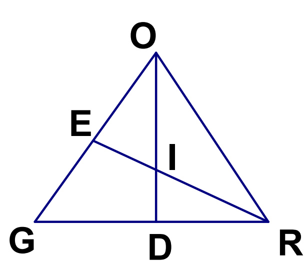
7. Given: $\overline{KO}$ is the perpendicular bisector of $\overline{DR}$
Prove: $\angle DKO \cong \angle RKO$



8. Given: $\overline{SA} \perp \overline{AR}$, $\overline{AR} \perp \overline{RE}$, B is the midpoint of $\overline{AR}$
Prove: $\Delta SAB \cong \Delta ERB$



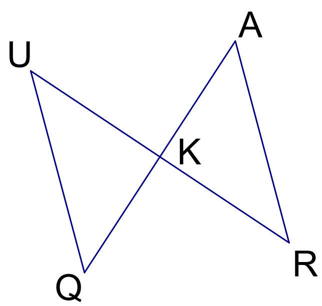
9. Given: $\overline{ER}$ bisects $\angle$ ORG, $\overline{OG} \perp \overline{RE}$
Prove: $\Delta ORE \cong \Delta GRE$



10. Given: $\overline{QA}$ bisects $\overline{UR}$

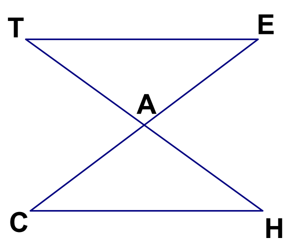
$\angle Q \cong \angle A$

Prove: $\overline{QU} \cong \overline{AR}$



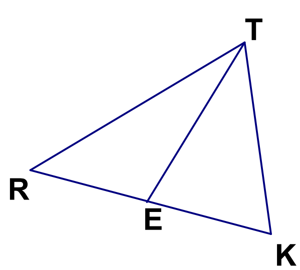
11. Given: $\overline{TH} and \overline{CE}$ bisect each other at A

Prove: $\Delta TAE \cong \Delta CAH$

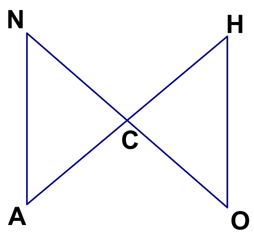


12. Given: E is the midpoint of $\overline{RK}$, $\overline{TR} \cong \overline{TK}$

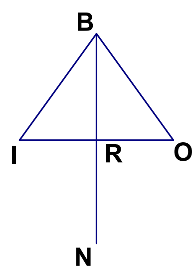
Prove: ∠ RTE≅ ∠ KTE



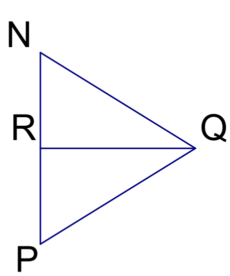
13. Given: $\overline{NO}$ and $\overline{HA}$ bisect each other
Prove: $\angle N \cong \angle O$



14. Given: $\overline{NB}$ is the perpendicular bisector of $\overline{IO}$,
Prove: $\overline{IB} \cong \overline{OB}$



15. Given: $\overline{QR}$ is the perpendicular bisector of $\overline{NP}$
Prove: $\angle NQR \cong \angle PQR$



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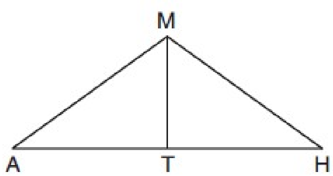
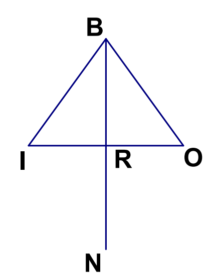
Triangle Proofs Review Sheet

1. Segment AB is the perpendicular bisector of $\overline{CD}$ at point M. Which statement is always true?
1) $\overline{CB} \cong \overline{DB}$
2) $\overline{CD} \cong \overline{AB}$
3) $\Delta ACD \cong \Delta BCD$
4) $\Delta ACM \cong \Delta BCM$

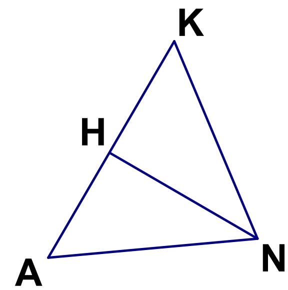
2. In triangle MAH below, $\overline{MT}$ is the perpendicular bisector of $\overline{AH}$.
Which statement is *not* always true?
1) $\triangle MAH$ is isosceles. 2) $\triangle MAT$ is isosceles. 3) $\overline{MT}$ bisects $\angle AMH$. 4) $\angle A$ and $\angle TMH$ are complementary.



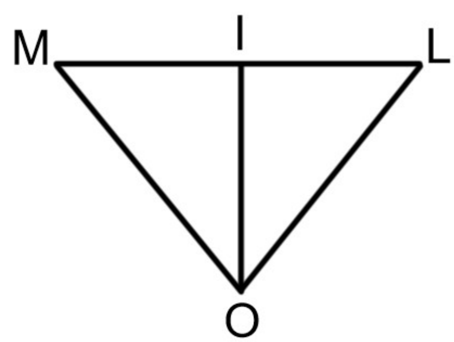
3. Given: $\overline{NB}$ bisects $\angle$ IBO, $\overline{BR} \perp \overline{IO}$
Prove: $\angle$ BIO $\cong$ $\angle$ BOI



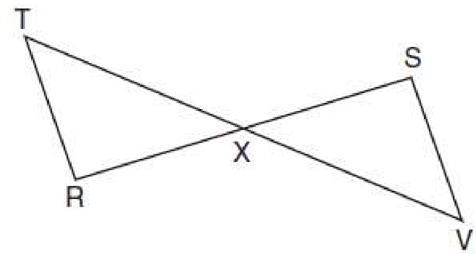
4. Given: $\overline{HN} \perp \overline{KA}$, $\overline{KN} \cong \overline{AN}$
Prove: $\angle HAN \cong \angle HKN$



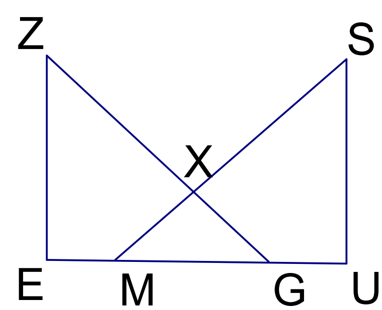
5. Given: $\overline{OI}$ is the perpendicular bisector of $\overline{ML}$
Prove: ΔMLO is isosceles



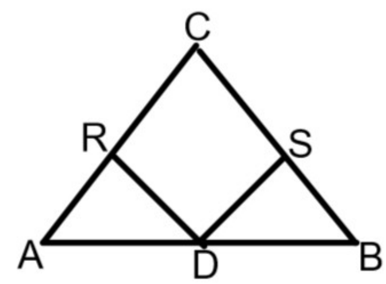
6. Given: $\overline{RS}$ and $\overline{TV}$ bisect each other at point X
$\overline{TR}$ and $\overline{SV}$ are drawn
Prove: $\overline{TR} \parallel \overline{SV}$



7. Given: $\overline{ZE} \perp \overline{EU}$, $\overline{SU} \perp \overline{EU}$, $\overline{ZE} \cong \overline{SU}$, $\overline{EM} \cong \overline{GU}$
Prove: $\angle Z \cong \angle S$



8. Given: In ΔABC, $\overline{CA} \cong \overline{CB}$, $\overline{AR} \cong \overline{BS}$, $\overline{DR} \perp \overline{AC}$, and $\overline{DS} \perp \overline{BC}$
Prove: $\overline{DR} \cong \overline{DS}$



Spiral Review

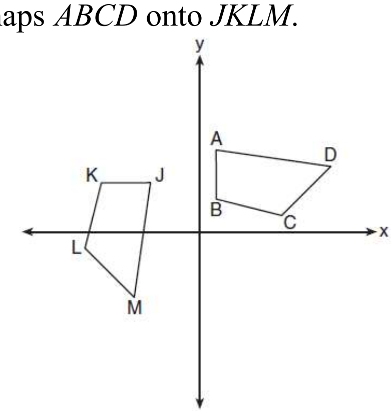
Corresponding Parts of Congruent Triangles are Congruent

Draw the triangles separately and place the letters into the triangles in the same order.
See what corresponds (same position)

9. In the diagram below, a sequence of rigid motions maps *ABCD* onto *JKLM*.

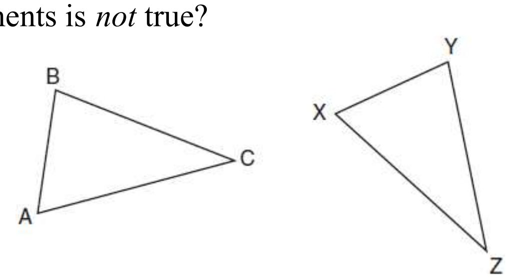
Which of the following statements must be true?

1) $\angle L \cong \angle B$ 3) $\overline{JK} \cong \overline{AC}$
2) $\angle A \cong \angle J$ 4) $\overline{JM} \cong \overline{AB}$



10. In the diagram below of $\triangle ABC$ and $\triangle XYZ$, a sequence of rigid motions maps $\angle A$ onto $\angle X$, $\angle C$ onto $\angle Z$, and $\overline{AC}$ onto $\overline{XZ}$.. Which of the following statements is *not* true?

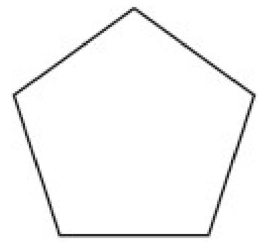
1) $\overline{AB} \cong \overline{XY}$
2) $\overline{BC} \cong \overline{XZ}$
3) $\angle B \cong \angle Y$
4) $\angle C \cong \angle Z$



Rotating Regular Polygons onto Themselves

1) The minimum rotation is $\frac{360}{n}$.
2) Any multiple of that will also map the regular polygon onto itself!

11. The regular polygon below is rotated about its center.
Which angle of rotation will carry the figure onto itself?



1) 60°
2) 108°
3) 216°
4) 540°

12. Which of the following rotations would not map an equilateral triangle onto itself?

(1) 120º (3) 180º
(2) 240º (4) 480º

Triangle Inequality Theorem

The two smallest sides of a triangle must add to be greater than the third side

13. Which of the following cannot make up the three sides of a triangle?

1) {3,5,4} 3) {9,7,5}
2) {2,2,3} 4) {6,1,4}

14. Which of the following can make up the three sides of a triangle?

1) {2,4,2} 3) {8,1,6}
2) {1,7,4} 4) {5,5,7}