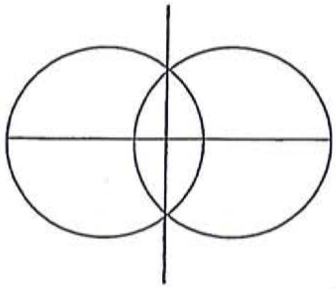
Name: KEY Date: ________ Per: ________

Topic 3 Test Review

Answer each question below. Be sure to show all work and clearly indicate any construction markings where necessary.



____ 1) Which of the following constructions are illustrated by the diagram to the left?

(1) Angle bisector of ∠ABD
$\boxed{(2)}$ Perpendicular bisector of $\overline{AB}$
(3) Midpoint of $\overline{CD}$
(4) Perpendicular bisector of $\overline{CD}$

____ 2) Joey sketches a triangle inside of a circle so that each of its vertices touch 3 distinct points on the circle. Which of the following constructions can he do to the triangle to determine the center of the circle?

$\boxed{(1)}$ Construct the three angle bisectors of the triangle
(2) Construct the three perpendicular bisectors of the triangle
(3) Construct the diameter of the circle
(4) Neither

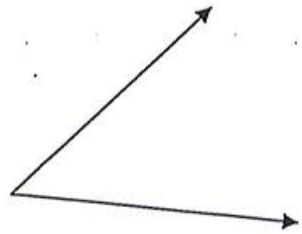
Incenter = Angle Bisector

Match each of the following properties to their proper example:

E 3) Symmetric Property
A 4) Reflexive Property
C 5) Transitive Property
B 6) Addition Property of Equality
G 7) Subtraction Property of Equality
F 8) Multiplication Property of Equality
H 9) Division Property of Equality
D 10) Substitution Property

a. AB = AB
b. If AB = CD, then AB + BC = BC + CD
c. If AB = CD and BC = CD, then AB = BC
d. If m∠A + m∠B = 90 and m∠A = m∠C, then m∠B + m∠C = 90.
e. If AB = CD then CD = AB.
f. If AB = BC, then 2AB = 2BC.
g. If m∠A + m∠B = m∠A + m∠C, then m∠B = m∠C
h. If AB = BC, then $\frac{AB}{3} = \frac{BC}{3}$

11) Construct the angle bisector of the angle below.



12) Construct a 60° angle at point P below.

13) The angles of a triangle can be represented by 2x + 10, x + 20 and 3x. Determine the value of x. Classify the triangle by angles and sides.

$2x + 10 + x + 20 + 3x = 180$

$6x + 30 = 180$

$6x = 150$

$x = 25$

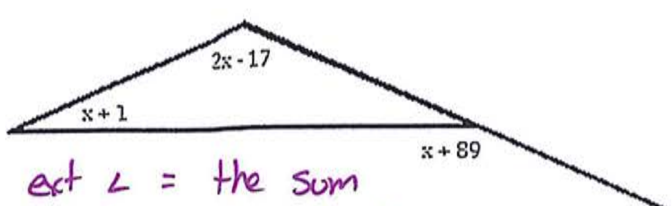
$2x + 10 = 60$

$x + 20 = 45$

$3x = 75$

Acute Scalene

14) Find the value of x below:



The ext ∠ = the sum of the 2 remote int ∠'s

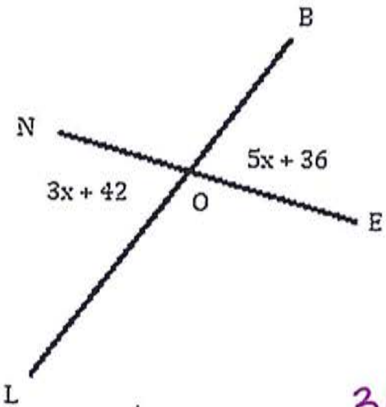
$x + 1 + 2x - 17 = x + 89$

$3x - 16 = x + 89$

$2x = 105$

$x = 52.5$

15) Find m∠NOL below



Vertical ∠s are ≅

$3x + 42 = 5x + 36$

$6 = 2x$

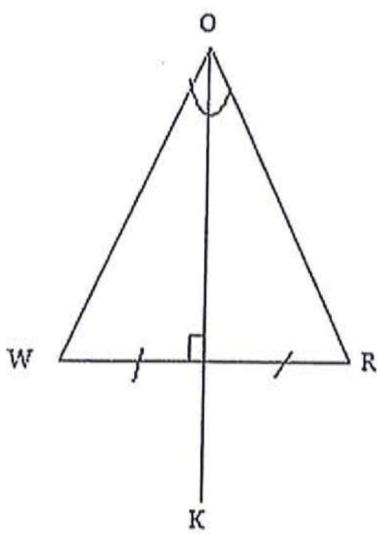
$x = 3$

$3(3) + 42$

$9 + 42$

$m\angle NOL = 51$

16) State 3 facts about $\overline{KO}$ below based on the given markings.



$\overline{KO}$ bisects ∠ WOR

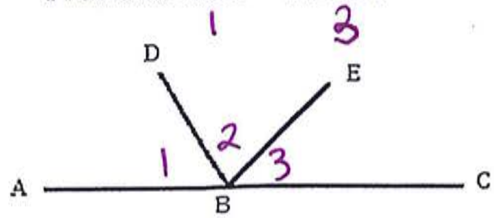
$\overline{KO}$ bisects $\overline{WR}$

$\overline{KO} \perp \overline{WR}$

More Geometric Proofs

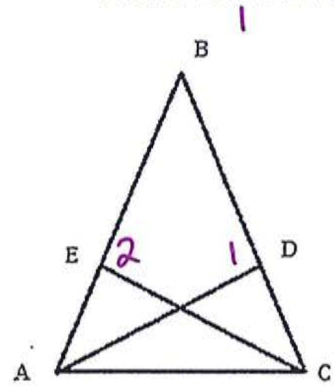
Use a formal proof to answer each of the following question below. Be sure to clearly identify your statements and reasons.

B 1) Given: $\overline{ABC}$, m∠ABE = m∠CBD
Prove: m∠ABD = m∠CBE



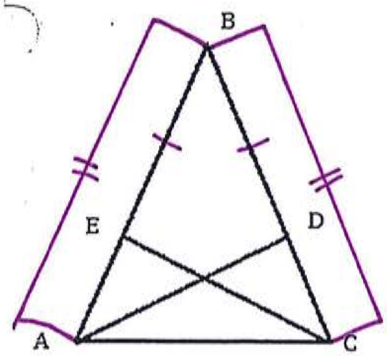
S	R
① $\overline{ABC}$ m∠ABE = m∠CBD	① Given
② m∠2 = m∠2	② Reflexive
③ m∠ABE − m∠2 = m∠CBD − m∠2	③ Subtraction
∴ m∠1 = m∠3	

2) Given: $\overline{CD} \perp \overline{AB}$ and $\overline{AD} \perp \overline{BC}$
Prove: ∠ADB ≅ ∠CEB



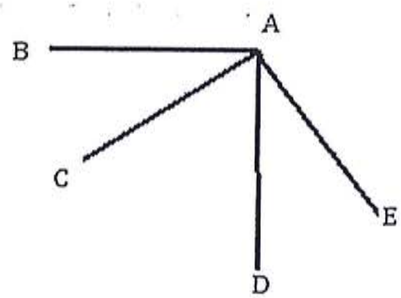
S	R
① $\overline{CD} \perp \overline{AB}$ $\overline{AD} \perp \overline{BC}$	① Given
② ∠1 is a rt ∠ ∠2 is a rt ∠	② ⊥ lines form rt ∠s
③ ∠1 ≅ ∠2	③ All rt ∠s are ≅

3) Given: $\overline{AB} \cong \overline{CB}$ and $\overline{EB} \cong \overline{DB}$
Prove: $\overline{AE} \cong \overline{CD}$



S	R
① $\overline{AB} \cong \overline{CB}$ $\overline{EB} \cong \overline{DB}$	① Given
② $\overline{AB} - \overline{EB}$ $= \overline{CB} - \overline{DB}$	② Subtraction
$\therefore \overline{AE} \cong \overline{CD}$	

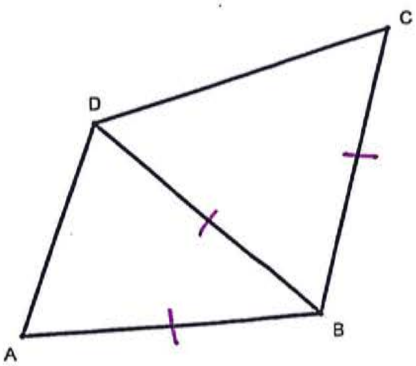
4) Given: $\overline{AD} \perp \overline{AB}$ and $\overline{AE} \perp \overline{AC}$
Prove: m∠BAD = m∠EAC



S	R
① $\overline{AD} \perp \overline{AB}$ $\overline{AE} \perp \overline{AC}$	① Given
② ∠BAD is a rt ∠ ∠EAC is a rt ∠	② ⊥ lines form rt ∠s
③ m∠BAD = m∠EAC	③ All rt ∠s are = in measure

5) Given: ΔABD is isosceles with vertex at B and $\overline{AB} \cong \overline{BC}$

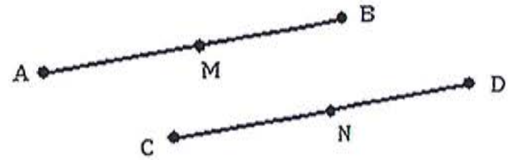
Prove: ΔCBD is isosceles



S	R
① ΔABD is Iso, $\overline{AB} \cong \overline{BC}$	① Given
② $\overline{AB} \cong \overline{DB}$	② An iso Δ has 2 $\cong$ sides
③ $\overline{DB} \cong \overline{BC}$	③ Substitution
④ ΔCBD is Iso	④ If 2 sides of a Δ are $\cong$, the Δ is Iso

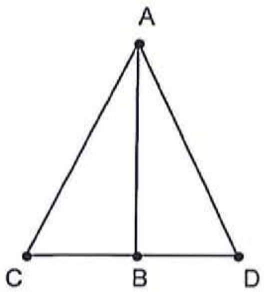
6) Given: M is the midpoint of $\overline{AB}$, AM = CN, and BM = DN

Prove: N is the midpoint of $\overline{CD}$



S	R
① M is mdpt of $\overline{AB}$, AM = CN, BM = DN	① Given
② AM = BM	② A mdpt creates 2 = segments
③ CN = DN	③ Substitution
④ N is the mdpt of $\overline{CD}$	④ A mdpt creates 2 = segments

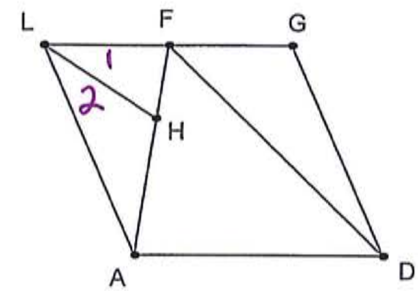
7)



Given: In $\triangle ABD$, $\overline{AB}$ bisects $\overline{CD}$
Prove: $\overline{CB} \cong \overline{BD}$

S	R
① $\overline{AB}$ bisects $\overline{CD}$	① Given
② B is mdpt $\overline{CD}$	② A seg bisector creates a mdpt.
③ $\overline{CB} \cong BD$	③ A mdpt creates 2 ≅ segments

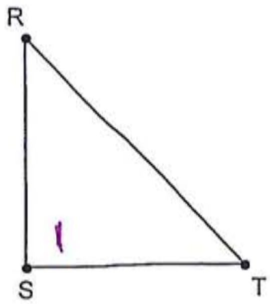
8)



Given: In parallelogram GLAD
$\overline{HL}$ bisects $\angle GLA$
Prove: $\angle FLH \cong \angle ALH$
1 2

S	R
① $\overline{HL}$ bisects $\angle GLA$	① Given
② $\angle 1 \cong \angle 2$	② An $\angle$ bisector creates 2 ≅ $\angle$s

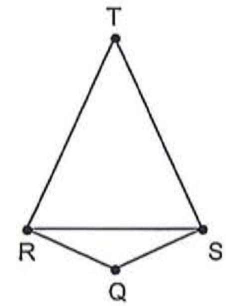
9)



Given: In $\triangle RST$, $\overline{RS} \perp \overline{ST}$
Prove: $\triangle RST$ is a right triangle.

S	R
① $\overline{RS} \perp \overline{ST}$	① Given
② $\angle 1$ is a rt $\angle$	② $\perp$ lines form rt $\angle$s
③ $\triangle RST$ is rt $\triangle$	③ A $\triangle$ w/ 1 rt $\angle$ is a rt $\triangle$

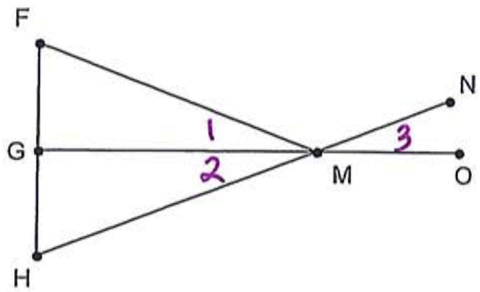
10)



Given: $\overline{TR} \perp \overline{RQ}$, $\overline{TS} \perp \overline{SQ}$
Prove: $\angle TRQ \cong \angle TSQ$

S	R
① $\overline{TR} \perp \overline{RQ}$ $\overline{TS} \perp \overline{SQ}$	① Given
② $\angle TRQ$ is a rt $\angle$ $\angle TSQ$ is a rt $\angle$	② $\perp$ lines form rt $\angle$s
③ $\angle TRQ \cong \angle TSQ$	③ All rt $\angle$s are $\cong$

11)



Given: $\overrightarrow{GO}$ bisects $\angle FMH$

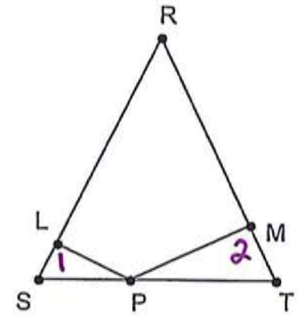
$\overleftrightarrow{GMO}$ and $\overleftrightarrow{HMN}$ intersect at M

Prove: $\angle FMG \cong \angle NMO$

1 3

S	R
① $\overrightarrow{GO}$ bisects ∠FMH	① Given
② $\overleftrightarrow{GMO}$ & $\overleftrightarrow{HMN}$ intersect at M	
② ∠1 ≅ ∠2	② An ∠ bisector creates 2 ≅ ∠s
③ ∠2 ≅ ∠3	③ Vert ∠s are ≅
④ ∠1 ≅ ∠3	④ Substitution

12)



Given: $\overline{PL} \perp \overline{RS}$, $\overline{PM} \perp \overline{RT}$

Prove: $m\angle PLS = m\angle PMT$

S	R
① $\overline{PL} \perp \overline{RS}$, $\overline{PM} \perp \overline{RT}$	① Given
② ∠1 is rt ∠, ∠2 is rt ∠	② ⊥ lines form rt ∠s
③ ∠1 ≅ ∠2	③ All rt ∠s are ≅