Name:_____ Period:_____ GH

HONORS GEOMETRY FALL SEMESTER REVIEW

Work all problems on a separate sheet of paper. This review must be COMPLETE with ALL WORK SHOWN in order to be eligible to exempt the final.

Test 1: Algebra

1–6: Solve. Justify each step with a property of equality.

1. $2(4x+2)=4(x+4)$

8x + 4 = 4x + 16 Distribute POE

4x = 12 Subtraction POE

x = 3 Division POE

2. $\frac{1}{2}x+4=18$

½ x = 14 Subtraction POE

x = 28 Division POE

3. $5x-2(x-3)=\frac{3}{4}(16-2x)$

5x – 2x + 6 = 12 – $\frac{3}{2}$x Distribute POE

3x + 6 = 12 – $\frac{3}{2}$x Combine Like Terms

$\frac{9}{2}$x + 6 = 12 Addition POE

$\frac{9}{2}$x = 6 Subtraction POE

x = $\frac{4}{3}$ Division POE

4. $x^2-11x=-30$

x^2 – 11x + 30 = 0 Addition POE

(x – 5)(x – 6) = 0 Factor

x – 5 = 0 or x – 6 = 0 Zero Product Prop

x = 5 or x = 6 Addition POE

5. $3x^2-12=0$

$3x^2$ = 12 Addition POE

x^2 = 4 Division POE

x = 4 or x = -4 Square Root

6. $x^2+17x=0$

(x + 0)(x + 17) = 0 Factor

x + 0 = 0 or x + 17 = 0 Zero Product Prop

x = 0 or x = 17 Subtraction POE

7–8: Solve each system of equations by substitution or elimination.

7. $\begin{cases}12x+4y=-4\\2x-y=6\end{cases}$ x = 1; y = – 4

8. $\begin{cases}4y-2x=4\\10x-5y=10\end{cases}$ x = 2; y = 2

9. Are the lines $2x+4y=-10$ and $y=-\frac{1}{2}x+5$ parallel, perpendicular, intersecting, or coinciding?

10. Are the lines $6x+2y=2$ and $3x+9y=3$ parallel, perpendicular, intersecting, or coinciding?

11. $\overline{FC}$ is a diagonal of square FACE. If the endpoints of the diagonal are (–2,5) and(4, –6), what is the coordinate of the center of the square? (1, -1/2)

12. M bisects $\overline{RS}$. If R is at (4, –2) and M is at (–1, 5), find the coordinates at S. (– 6, 12)

13. Find PQ if P is the point (2, –7) and Q is the point (–3, –4). $\sqrt{34} \approx 5.83$

14. Find AB with A(–3, 5) B(6, –1). $\sqrt{117} \approx 10.82$

Test 2: Segments

Let S be between R and T. Solve for x and then find the unknown segment measurements.

1. $RS = 4x+3$, $ST = 5x-10$, $RT = 6x+14$

$x = 7$

$RS = 31$

$ST = 25$

$RT = 56$

2. $RS = \frac{1}{2}x+2$, $ST = 3x+\frac{3}{2}$, $RT = 5x+2$

$x = 1$

$RS = 2\frac{1}{2}$

$ST = 4\frac{1}{2}$

$RT = 7$

If B is the midpoint of $\overline{AC}$, solve for x then find the measures of the unknown segments.

3. $AB = 4x-4$, $AC = 7x-3$

$x = 5$

$AB = 16$

$AC = 32$

4. $AB = 4x+10$, $BC = 10x+7$

$x = \frac{1}{2}$

$AB = 12$

$BC = 12$

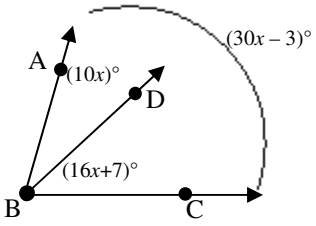
Test 3: Angles

5. $x =$ 2 ½

$m\angle ABD =$ 25°

$m\angle DBC =$ 47°

$m\angle ABC =$ 72°



6. $\overrightarrow{IS}$ bisects $\angle FIH$. $m\angle FIS = (7x+13)°$;

$m\angle FIH = (19x-7)°$.

$x =$ 6.6

$m\angle SIH =$ 59.2°

$m\angle FIH =$ 118.4°

7. K is in the interior of $\angle MIL$.

$m\angle MIK = (1-19x)°$; $m\angle KIL = (5x+83)°$;

$m\angle MIL = (80-15x)°$.

$x =$ – 4

$m\angle MIK =$ 77°

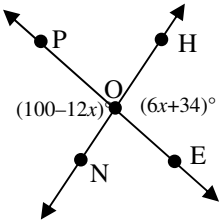
$m\angle KIL =$ 63°

$m\angle MIL =$ 140°

8. $x =$ $3\frac{2}{3}$

$m\angle PON =$ 56°

$m\angle POH =$ 124°



9. $\overrightarrow{AH}$ bisects $\angle MAT$. $m\angle MAH = (12x-13)°$;

$m\angle HAT = (9x+2)°$.

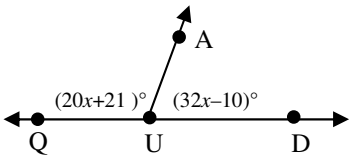
$x =$ 5

$m\angle MAH =$ 47° $m\angle MAT =$ 94°

10. $x =$ 3 ¼

$m\angle QUA =$ 86°

$m\angle DUA =$ 94°



Test 4: Logic and Proofs

Identify the hypothesis and conclusion of the following statements.

1. If you multiply two irrational numbers, then the product is irrational.

2. If two points are distinct, then there is on line through them.

Write the inverse, converse, contrapositive, and the biconditional of the conditional statements.

3. If $m\measuredangle 1 = 35°$, then $\measuredangle 1$ is acute.

   Inverse: If m<1 ≠ 35°, then <1 is not acute.
   Converse: If <1 is acute, then m<1 = 35°
   Contrapositive: If <1 is not acute, then m<1 ≠ 35°.
   Biconditional: m<1 = 35° if and only if <1 is acute.

4. If a quadrilateral is a rectangle, then it has congruent diagonals.

   Inverse: If a quadrilateral is not a rectangle, then it does not have congruent diagonals.
   Converse: If a quadrilateral has congruent diagonals, then it is a rectangle.
   Contrapositive: If a quadrilateral does not have congruent diagonals, then it is not a rectangle.
   Biconditional: A quadrilateral is a rectangle if and only if it has congruent diagonals.

Find the truth value for each conditional/biconditional. If it is false, give a counterexample.

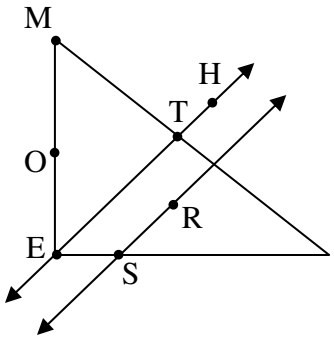
5. If two angles are adjacent, then they have a common ray. True

6. If x is a whole number, then $x = 2$ False, x = 3 is a whole number

7. The sides of a triangle measure 3, 7, and 15 if and only if the perimeter is 25. False, 6, 10, 9

8. Two angles are complementary if and only if the sum of their measures is 90°. True

Based on the picture alone, determine if each statement is true or false.



9. $\overleftrightarrow{ET} \parallel \overleftrightarrow{SR}$ False

10. $\measuredangle MES$ is a right angle. False
11. T is between E and H True
12. M, O, S, and H are coplanar True
13. $\overline{MO} \cong \overline{OE}$ False
14. $\measuredangle OET \cong \measuredangle TES$ False

For each statement, make a conclusion and justify it.

15. Given: $\overline{TO} \cong \overline{AN}$

Conclusion: _TO = AN__

Why: ____Definition of congruent_____

16. Given: E is the midpoint of $\overline{BD}$

Conclusion: _____$\overline{BE} \cong \overline{ED}$_____

Why: ____Definition of midpoint_____

17. Given: A bisects $\overline{CT}$

Conclusion: __$\overline{CA} \cong \overline{AT}$ _

Why: _____Definition of bisects_____

18. Given: $\overrightarrow{AT}$ bisects $\measuredangle MAH$

Conclusion: __$\measuredangle MAT \cong \measuredangle TAH$ ____

Why: __Definition of bisects_____

19. Given: $\measuredangle DAY$ and $\measuredangle YAK$ are a linear pair.

Conclusion: <DAY and <YAK are supplementary
Why: _____Linear Pair theorem_____

20. Given: $\measuredangle TOM$ is the supplement of $\measuredangle SUE$

Conclusion: __m<TOM + m<SUE = 180____

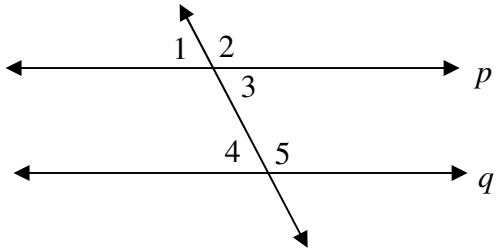
Why: __Definition of supplementary_____

Test 5: Lines and Transversals

****Correction to problem done in blue****

1. Given: $p \parallel q$; $m\angle 3 = 22x + 4y$

$m\angle 4 = 2x + 5y$; $m\angle 5 = 18x + 3y$



$x =$ 1

$y =$ 20°

$m\angle 1 =$ 102°

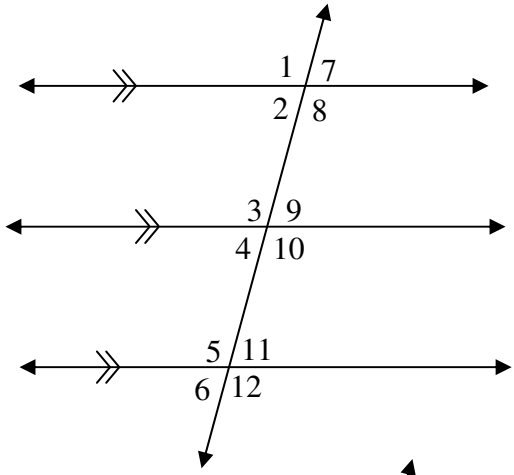
For the following problems, (a) tell what kind of angles are represented; (b) solve for x; and (c) find the measures of the angles. NOTE: Even though all six problems use the same diagram, each one is separate! Angle measures will not be the same from one problem to the next.

$m\angle 10 = 9x + 22$; $m\angle 12 = 12x - 14$

a. Corresponding angles

b. x = 12

c. 130° and 130°



3. $m\angle 6 = 14x - 18$; $m\angle 11 = 9x + 17$

a. Vertical angles

b. x = 7

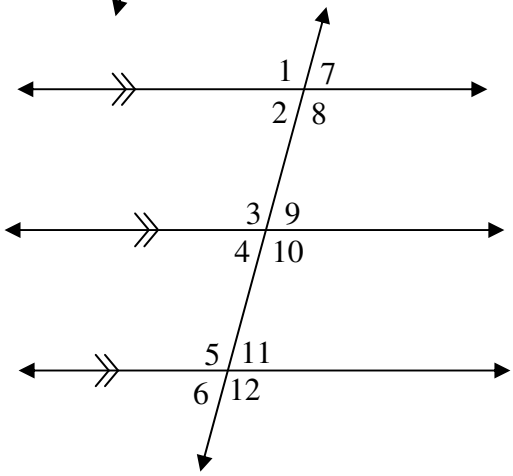
c. 80° and 80°

4. $m\angle 4 = 2x + 46$; $m\angle 5 = -13x + 46$

a. Same side interior angles

b. x = -8

c. 30° and 150°



5. $m\angle 2 = 8x - 3$; $m\angle 9 = 3x + 27$

a. Alternate interior angles

b. x = 6

c. 45° and 45°

6. $m\angle 1 = 10x + 3$; $m\angle 7 = 2x - 3$

a. Linear pair

b. x = 15

c. 153° and 27°

7. $m\angle 3 = -2x + 110$; $m\angle 12 = 4x + 56$

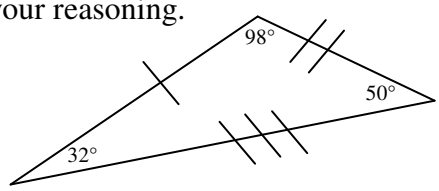
a. Alternate exterior angles

b. x = 9

c. 92° and 92°

Test 6: Triangles and Triangle Congruence

1. Classify the following triangle by sides AND angles, and explain your reasoning.



By sides _Scalene_ Why? __no sides are congruent___

By angles _Obtuse_ Why? _1 obtuse angle __

2. The measures of the angles of a triangle are in the ratio of 2:6:10. What are the measures of the angles?

20º, 60º, 100º

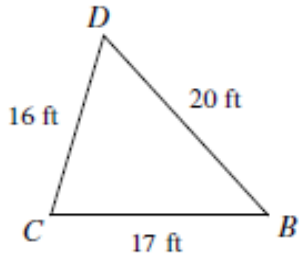
3. Tell if the following measures can be the side lengths of a triangle, and explain how you know.

a. 7, 5, 4 YES / NO WHY? ___5 + 4 > 7_____

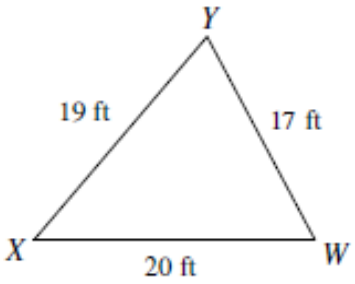
b. 3, 6, 2 YES / NO WHY? ___3 + 2 < 6_____

c. 2, 15, 16 YES / NO WHY? ____2 + 15 > 16_____

4. Name the angles of the triangle in order from shortest to longest.

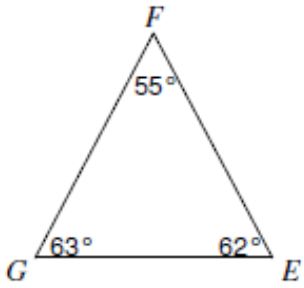


B, D, C

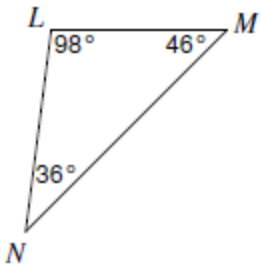


X, W, Y

5. Name the sides of the triangle in order from shortest to longest.



GE, GF, FE_



LM, LN, NM

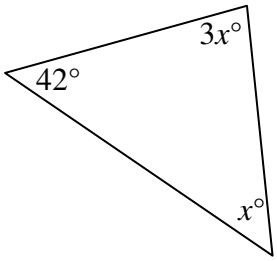
6. A triangle has a perimeter of 135 cm. One side of the triangle measures $(3x)$ cm. Find the value of x that makes the triangle equilateral.

x = 45

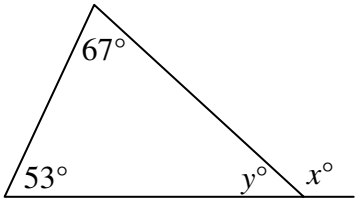
7. Given the isosceles ΔTRY, with $\measuredangle Y$ as the vertex angle, $m\measuredangle T = 15x + 3$ and $m\measuredangle R = 8x + 31$, find:

x = _4_ m<R = _63°__ m<T = _63°_ m<Y = _54°_

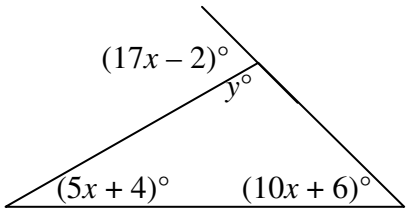
8. x = _34.5°_ 3x = _103.5°



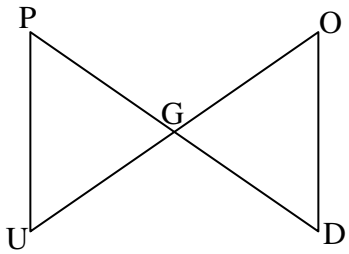
4. x = 120°_ y = 60°



5. x = 6_ y = _80°_



9. $\triangle PUG \cong \triangle DOG$. Name all corresponding parts.



_<P_ ≅ _<D__ $\overline{PU} \cong \overline{DO}$

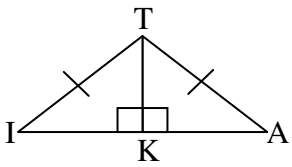
_<U__ ≅ __<O__ $\overline{PG} \cong \overline{DG}$

_<G__ ≅ __<G__ $\overline{UG} \cong \overline{OG}$

10. Name the 5 postulates/theorems that prove two triangles congruent. Draw an example of each way using the appropriate markings. **Examples are not drawn – look in book**

ASA, __SAS_, __AAS_, __SSS__, __HL__

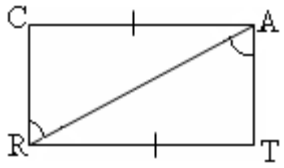
11. Why is $\triangle KIT \cong \triangle KAT$? ___HL___



12. a) Are the triangles congruent?_NO__

b) Why/Why not? _____

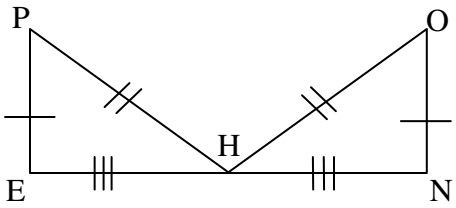
c) If so, _____ ≅ _____



10. a) Are the triangles congruent? _yes_

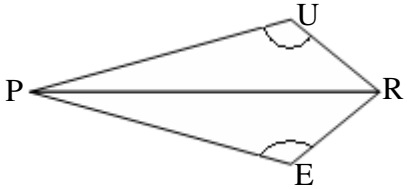
b) Why/Why not? _SSS_

c) If so, ΔPEH ≅ _ΔONH___



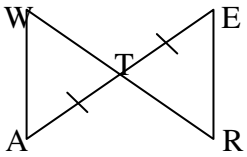
13. What part is missing to use AAS to prove these two triangles congruent?

<URP ≅ __<ERP___

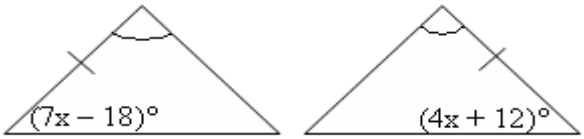


14. What part is missing to use AAS to prove these two triangles congruent?

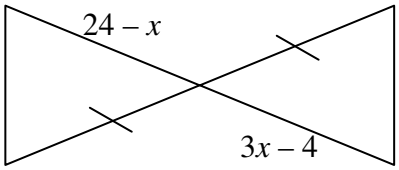
$\measuredangle W \cong \measuredangle R$



15. Find the value of x that makes these two triangles congruent. x = 10

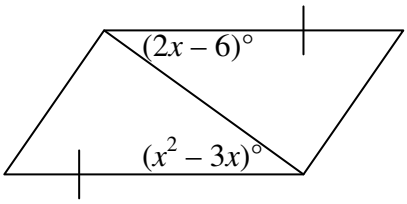


16. Find the value of *x* that makes these two triangles congruent. x = 7



17. Find the value(s) for *x* that makes these two triangles congruent.

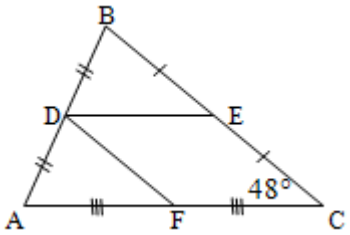
. x = 2 and 3



Test 8: Triangle Properties

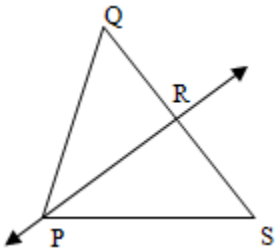
1. Using $\triangle ABC$ below, find *DE, AC,* and $m\measuredangle DFC$ if $AF = 12$.

DE = 12
AC = 24
$m\measuredangle DFC = 132°$

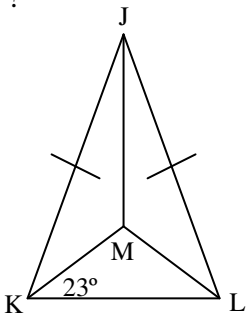


2. In the figure below, $\overline{PR}$ is the angle bisector of $\measuredangle QPS$. If $m\measuredangle QPS = x^2 + 5x$ and $m\measuredangle QPR = 3x + 10$, solve for *x*.

x = 5



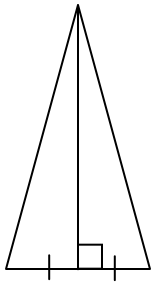
3. Draw a picture showing *M*, the incenter of isosceles $\triangle JKL$, with $JK = JL$. If $m\angle MKL = 23°$, what is $m\angle KJL$?



$m\angle KJL = 88°$

4. If exactly one altitude of a triangle is the same as exactly one perpendicular bisector, what kind of triangle is it? Draw a picture.

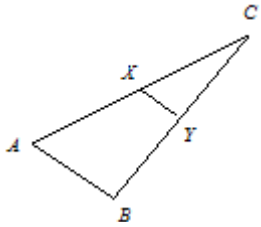
Isosceles



5. If you are trying to find a central location that is equidistant to three points, explain when you would use the incenter and when you would use the circumcenter. Where would the three points of interest be located for each?

You would use the incenter when you are trying to find a location that is equidistant to the sides of the triangle created by connecting the three points. You would use the circumcenter to when you are trying to find a location that is equidistant to the three points. For the incenter, the three points of interest would be located at the intersections of a triangle and the circle that is inscribed inside of that triangle. For the circumcenter, the three points of interest would be located at the intersections of a triangle and the circle that is circumscribed about that triangle.

6. Given $\triangle ABC$ with $AB = 10$, $BC = 30$, and $CA = 34$, find the length of midsegment $\overline{XY}$.



XY = 5

Test 9: Radicals and Special Right Triangles

1. $-6\sqrt{5}$
2. 17
3. $x^2\sqrt{x}$
4. $5\sqrt{3} - 3\sqrt{5}$
5. $\frac{\sqrt{15}}{3}$
6. $\frac{\sqrt{30}}{10}$
7. $\frac{2\sqrt{14}}{15}$
8. $-12\sqrt{30}$
9. $60\sqrt{5}$

10. $\frac{\sqrt{3}}{2}$

11. $\frac{2\sqrt{7}}{7}$

12. $8p\sqrt{3}$ and $4p\sqrt{3}$

13. $6\sqrt{5}$

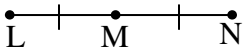
14. $30\sqrt{7}+10\sqrt{21}$

15. $162\ \text{in}^2$

16. 17.65 ft

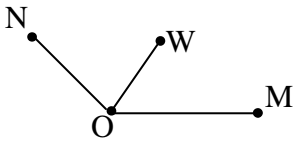
Proofs

Algebraic Proofs: Find each variable.

1. 

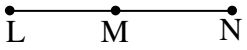
Given: LM = 5y + 6, MN = 2y + 21

Statements	Reasons
1. LM = MN	1. Definition ≅
2. 5y + 6 = 2y + 21	2. Substitution
3. 3y + 6 = 21	3. Subtraction POE
4. 3y = 15	4. Subtraction POE
5. y = 3	5. Division POE

2. 

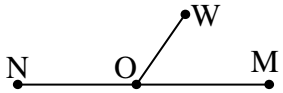
Given: $m\angle NOW = (3x+5)°, m\angle WOM = (6x-16)°$ and $m\angle NOM = (8x)°$

Statements	Reasons
1. m<NOW + m<WOM = m<NOM	1. Angle addition
2. 3x + 5 + 6x – 16 = 8x	2. Substitution
3. 9x – 11 = 8x	3. Combine like terms
4. 9x = 8x + 11	4. Addition POE
5. x = 11	5. Subtraction POE

3. 

Given: LM = 3n, MN = 25, LN = 9n - 5

Statements	Reasons
1. LM + MN = LN	1. Segment Addition
2. 3n + 25 = 9n – 5	2. Substitution
3. -6n + 25 = -5	3. Subtraction POE
4. -6n = -30	4. Subtraction POE
5. n = 5	5. Division POE

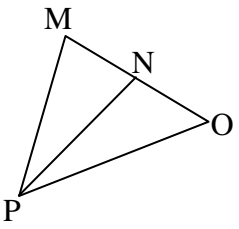
4. 

Given: $m\measuredangle NOW = (4n+5)°$, $m\measuredangle WOM = (8n-5)°$

Statements	Reasons
1. <NOW and <WOM are supplementary	1. Linear Pair Theorem
2. m<NOW + m<WOM = 180°	2. Def. supplementary
3. 4n + 5 + 8n – 5 = 180	3. Substitution
4. 12n = 180	4. Combine Like Terms
5. n = 15	5. Division POE

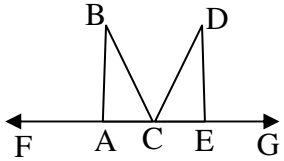
Geometric Proofs

1. Given: $\overline{PN}$ bisects $\overline{MO}$
$\overline{PN} \perp \overline{MO}$
Prove: $\Delta MNP \cong \Delta ONP$



Statements	Reasons
1. $\overline{PN}$ bisects $\overline{MO}$; $\overline{PN} \perp \overline{MO}$	1. Given
2. $\overline{MN} \cong \overline{NO}$	2. Def. bisects
3. <MNP & <OMP are rt. <'s	3. Def $\perp$
4. $\measuredangle MNP \cong \measuredangle ONP$	4. Right < $\cong$ Thrm.
5. $\overline{PN} \cong \overline{PN}$	5. Reflexive Prop. $\cong$
6. $\Delta MNP \cong \Delta ONP$	6. SAS $\cong$ Post.

2. Given: $\measuredangle FAB \cong \measuredangle GED$
$\measuredangle ACB \cong \measuredangle DCE$
$\overline{AC} \cong \overline{EC}$
Prove: $\Delta ABC \cong \Delta EDC$

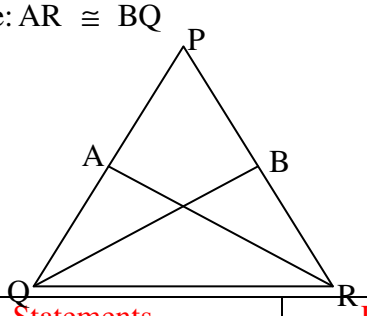


Statements	Reasons
1. $\measuredangle FAB \cong \measuredangle GED; \measuredangle ACB \cong \measuredangle DCE$ $\overline{AC} \cong \overline{EC}$	1. Given
2. <FAB and <BAC are supplementary; <GED and <DEC are supplementary	2. Linear Pair Thrm.
3. m<FAB + m<BAC = 180°; m<GED + m<DEC = 180°	3. Def. Supplementary
4. m<FAB = m<GED	4. Def $\cong$
5. m<FAB + m<BAC = m<GED + m<DEC	5. Transitive POE (3)
6. m<GED + m<BAC = m<GED + m<DEC	6. Substiution POE (4 and 5)
7. m<BAC = m<DEC	7. Subtraction POE
8. $\measuredangle BAC \cong \measuredangle DEC$	8. Def $\cong$
6. $\Delta ABC \cong \Delta EDC$	6. ASA $\cong$ Post.

3. Given: Isosceles ΔPQR with base $\overline{QR}$

$\overline{PA} \cong \overline{PB}$

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

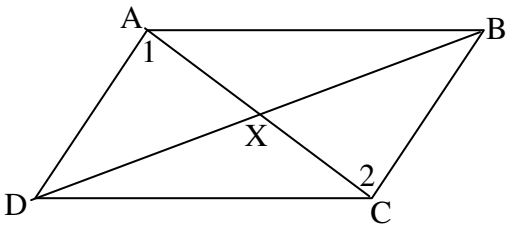


Statements	Reasons
1. Isosceles ΔPQR with base $\overline{QR}$; $\overline{PA} \cong \overline{PB}$	1. Given
2. $\measuredangle PQR \cong \measuredangle PRQ$	2. Isosceles Δ Thrm.
3. $\overline{QR} \cong \overline{QR}$	3. Reflexive Prop. ≅
4. PA = PB	4. Def ≅
5. $\overline{PQ} \cong \overline{PR}$	5. Def. Isosceles Δ
6. PQ = PR	6. Def ≅
7. PA + AQ = PQ; PB + BR = PR	7. Segment Addition Post.
8. PA + AQ = PB + BR	8. Substitution POE (6 and 7)
9. PB + AQ = PB + BR	9. Substitution POE (4 and 8)
10. AQ = BR	10. Subtraction POE
11. $\overline{AQ} \cong \overline{BR}$	11. Def ≅
12. ΔAQR ≅ ΔBRQ	12. SAS ≅ Post.
13. $\overline{AR} \cong \overline{BQ}$	13. CPCTC

4. Given: X is the midpoint of $\overline{AC}$.

$\measuredangle 1 \cong \measuredangle 2$

Prove: X is the midpoint of $\overline{BD}$



Statements	Reasons
1. X is the midpoint of $\overline{AC}$ $\measuredangle 1 \cong \measuredangle 2$	1. Given
2. $\overline{AX} \cong \overline{XC}$	2. Def. midpoint
3. $\measuredangle AXD \cong \measuredangle BXC$	3. Vertical Angle Thrm.
4. ΔAXD ≅ ΔCXB	4. ASA ≅ Post.
5. $\overline{DX} \cong \overline{XB}$	5. CPCTC
6. X is midpoint of $\overline{DB}$	6. Def. midpoint