Geometry Rules!
Chapter 4 Notes

Notes #20: Section 4.1 (Congruent Triangles) and Section 4.4 (Isosceles Triangles)

Congruent Figures

Corresponding Sides

Corresponding Angles

*****_____ parts of_____ triangles are _____ *****

Practice:

1.) If $\Delta CAT = \Delta DOG$, then complete: (draw a picture first)

$m\angle C =$ _____ $\Delta TCA \cong$ _____

$\overline{GD} \cong$ _____ $\angle O \cong$ _____

$TA =$ _____ $\Delta ODG \cong$ _____

2.) $\Delta ZAK \cong \Delta JOE$

a) Name three pairs of corresponding angles:

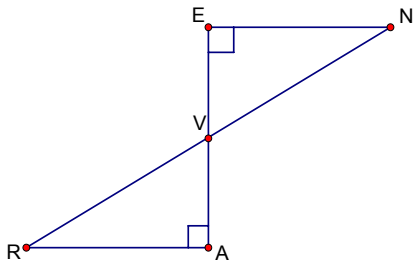
b) Name three pairs of corresponding sides:

3.) The two triangles shown are congruent; complete. (It will help to rotate the triangles first, to get them in corresponding positions)

a) $\Delta RAV \cong$ _____ b) $\angle R \cong$ _____

c) $EV =$ _____ d) $m\angle A =$ _____

e) $\overline{NV} =$ _____ f) $\Delta VRA \cong$ _____



Isosceles Triangles

Base Angles Theorem (or pons asinorum)

If two sides of a triangle are congruent, then the angles opposite them are _____.

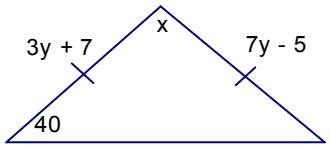
Converse of the Base Angles Theorem

If two angles of a triangle are congruent, then the _____ opposite them are _____.

Equilateral Triangles

Practice: Solve for x and y

4.)



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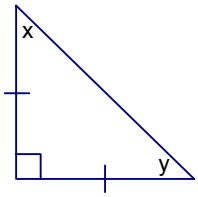

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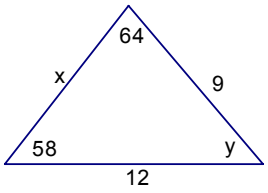

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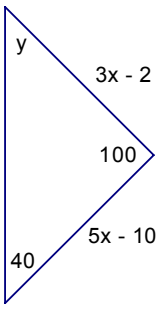
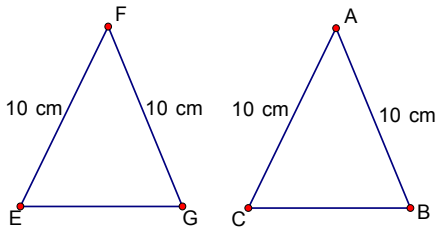


8.) In equilateral ΔXYZ, $m\angle X = a + b$ and $m\angle Y = 2a - b$. Find a and b.

9.) In equiangular ΔABC, $AB = 2x + y$, $BC = 6x - 2y$, and $AC = 10$. Solve for x and y.

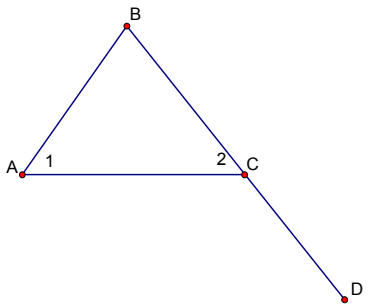
10.) What can you conclude from the picture?



11.)

Given: C is the midpoint of $\overline{BD}$
$\angle 1 \cong \angle 2$

Prove: $\overline{AB} \cong \overline{CD}$

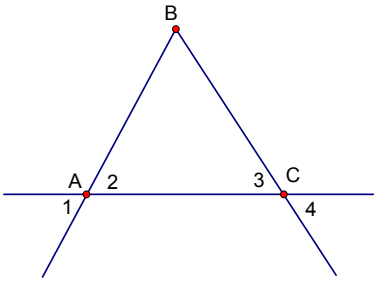


Statements	Reasons
1.)	1.)
2.)	2.)
3.) $\overline{AB} \cong \overline{BC}$	3.)
4.)	4.)

12.)

Given: $\angle 1 \cong \angle 4$

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



Statements	Reasons
1.)	1.)
2.)	2.)
3.)	3.)
4.)	4.)

Notes #21: Sections 4.2 and 4.5 (Methods of Proving Triangles Congruent)

Q: How can we prove that two triangles are congruent to each other?

A: Five ways: SSS, SAS, ASA, AAS, HL

SSS:
_____-_____-_____ Postulate

SAS:
_____-_____-_____ Postulate

ASA:
_____-_____-_____ Postulate

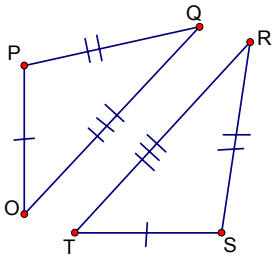
AAS:
_____-_____-_____ Theorem

HL:
_____-_____ Postulate

Are the triangles congruent? If so, write the congruence and name the postulate used.

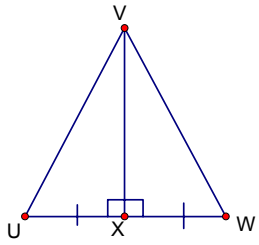
- Redraw your triangles so they line up
- You need three congruent pairs of sides/angles to follow: SSS, SAS, ASA, AAS, or HL
- Look for "hidden" pieces in:
  - vertical angles
  - overlapping sides
  - congruent angles formed by parallel lines
  - bisected angles
  - Base Angles Thm/Converse of Base Angles Thm
  - midpoints

1.)



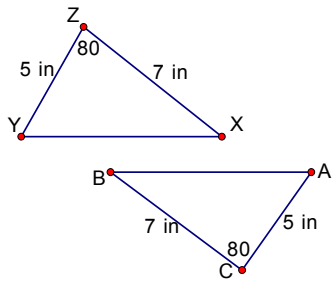
Δ _____ ≅ Δ _____ by _____

2.)



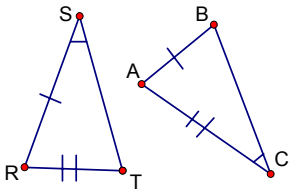
Δ _____ ≅ Δ _____ by _____

3.)



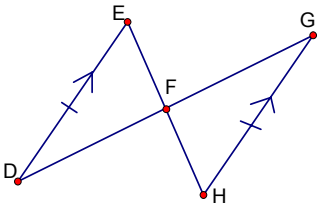
Δ _____ ≅ Δ _____ by _____

4.)



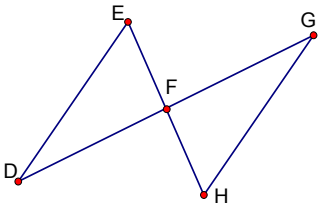
Δ _____ ≅Δ _____ by _____

5.)



Δ _____ ≅ Δ _____ by _____

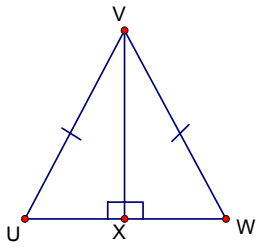
6.)



F is the midpoint of $\overline{DG}$ and $\overline{EH}$

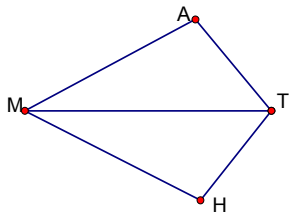
Δ _____ ≅ Δ _____ by _____

7.)



Δ _____ $\cong \Delta$ _____ by _____

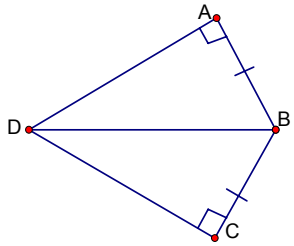
8.)



$\overline{MT}$ bisects $\angle AMH$ and $\angle ATH$

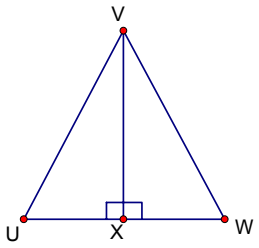
Δ _____ $\cong \Delta$ _____ by _____

9.)



Δ _____ $\cong \Delta$ _____ by _____

10.)

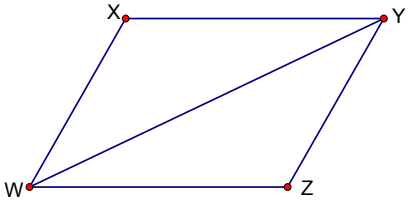


Δ _____ $\cong \Delta$ _____ by _____

11.)

Given: $\overline{WX} \cong \overline{YZ}$, $\overline{XY} \cong \overline{ZW}$

Prove: $\Delta WXY \cong \Delta YZW$

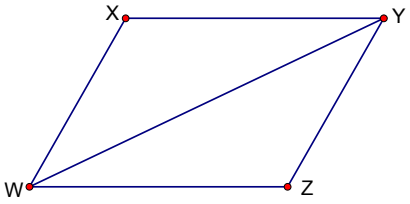


Statements	Reasons
1.)	1.)
2.)	2.)
3.)	3.)

12.)

Given: $\overline{WX} \cong \overline{YZ}$, $\overline{WX} \cong \overline{YZ}$

Prove: $\Delta WXY \cong \Delta YZW$

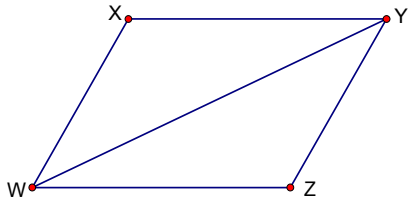


Statements	Reasons
1.)	1.)
2.)	2.)
3.)	3.)
4.)	4.)

Notes #22: More Proofs and Section 4.3 (Using Congruent Triangles)

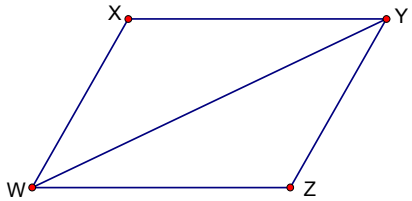
Are the triangles congruent? If so, write the congruence and name the postulate used.

1.)



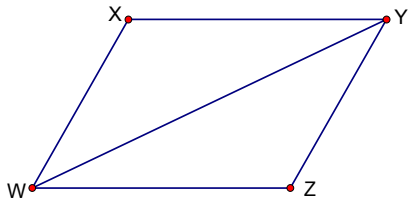
$\overline{WX} \cong \overline{YZ}$, $\overline{XY} \cong \overline{ZW}$

2.)



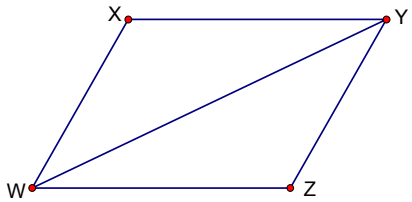
$\overline{WX} \cong \overline{YZ}$, $\overline{WX} \cong \overline{YZ}$

3.)



$\overline{WX} \cong \overline{YZ}$, $\overline{XY} \cong \overline{ZW}$

4.)



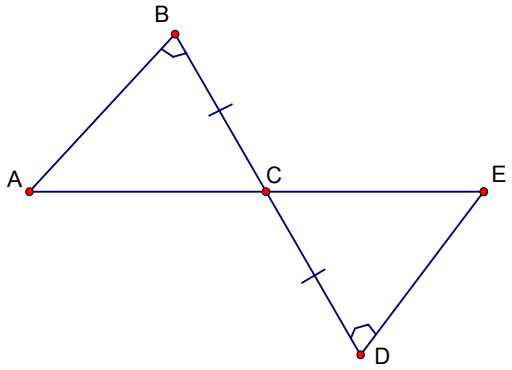
$\overline{WX} \cong \overline{YZ}$, $\overline{XY} \cong \overline{ZW}$

5.) Complete:

a) $\Delta ABC \cong$ _____ because _____

b) AB = ____ because _____

c) AC = EC because _____. Then C is the midpoint of _____ by _____.



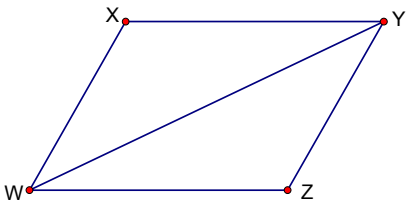
d) $\angle A \cong$ _____ because _____. Then AB = ED because _____.

Complete the proofs: follow these key steps

1. Re-draw and label your picture; mark congruencies
2. Find and list 3 congruencies:
   - shared sides (reflexive)
   - vertical angles
   - alternate interior/corresponding angles (when lines are ||)
   - angle bisectors
   - midpoints
   - Base Angles Theorem
3. State $\Delta \cong \Delta$ by SSS, SAS, ASA, AAS, or HL
4. State part $\cong$ part by CPCTC

6.) Given: $\overline{WX} \cong \overline{YZ}$, $\overline{WX} \cong \overline{YZ}$

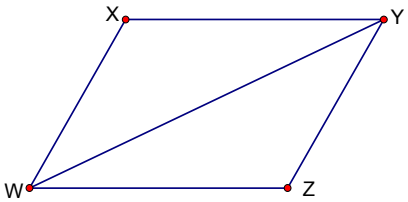
Prove: $\angle X \cong \angle Z$



Statements	Reasons
1.)	1.)
2.)	2.)
3.) Δ _____ $\cong \Delta$ _____	3.)
4.)	4.)

7.) Given: $\overline{WX} \cong \overline{YZ}$, $\overline{WX} \cong \overline{YZ}$

Prove: $\overline{XY} \cong \overline{ZW}$

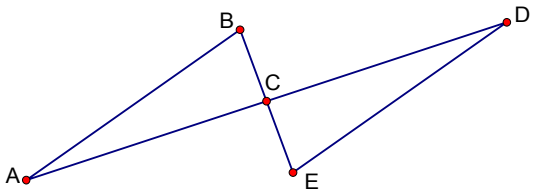


Statements	Reasons
1.)	1.)
2.)	2.)
3.)	3.)
4.) Δ _____ $\cong \Delta$ _____	4.)
5.)	5.)

8.)

Given: C is the midpoint of $\overline{AD}$ and $\overline{BE}$

Prove: $\angle A \cong \angle D$

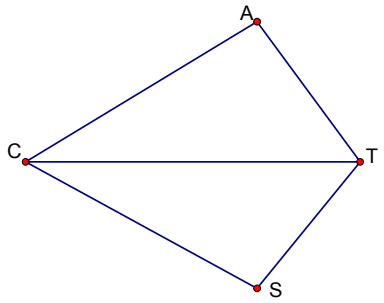


Statements	Reasons
1.)	1.)
2.)	2.) Definition of Midpoint
3.)	3.)
4.) Δ _____ $\cong \Delta$ _____	4.)
5.)	5.)

9.)

Given: $\overline{CT}$ bisects $\angle ACS$ and $\angle ATS$

Prove: $\angle A \cong \angle S$



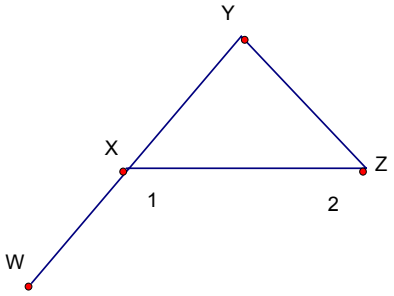
Statements	Reasons
1.)	1.)
2.)	2.)
3.)	3.)
4.)	4.)
5.)	5.)

10.)

Given:

$\angle 1 \cong \angle 2$, X is the midpoint of $\overline{WY}$

Prove: $\overline{WX} \cong \overline{YZ}$



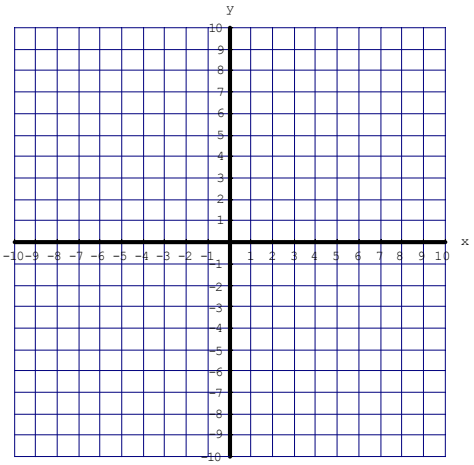
Statements	Reasons

Notes #23: Quiz and Algebra Review:

1.) Graph the points and name the quadrant in which each point is found:

A(-3, 2) B(0, -7)

C(4, -1) D(6, 0)



2.) Evaluate for $a = -2$ and $b = 3$

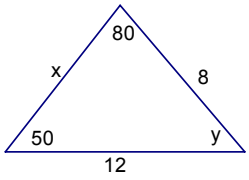
$$-a^2 - b(ab - 3)$$

3.) Simplify:

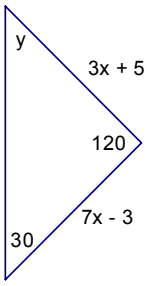
$$-3^2 - 4(2^2 - 1) - (-3)$$

4.) In equilateral ΔABC, $m\angle A = 2x + 4y$ and $m\angle B = x + 5y$. Solve for x and y.

5.) Solve for x and y



6.) Solve for x and y



7.) What does CPCTC stand for?

8.) $\Delta KIM \cong \Delta BEN$ Complete:

a) $IK =$ _____

b) $\angle I \cong$ _____

c) $\Delta ENB \cong$ _____