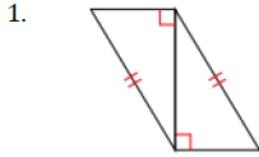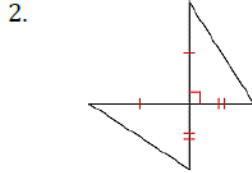Ch 4 – Congruent Triangles Study Guide
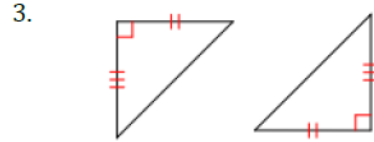
I. Are the triangles congruent?
1. Determine if the triangles are congruent by SSS, SAS, ASA, AAS, or HL. If the triangles CANNOT be proven congruent, write NONE for the reason.

1.

Reason: _____

2.

Reason: _____

3.

Reason: _____

4.

Reason: _____

5.

Reason: _____

6.

Reason: _____

7.

Reason: _____

8.

Reason: _____

9.
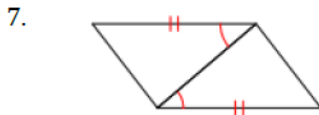
Reason: _____

II. Are the triangles congruent? Complete the triangle congruence statement.
1. Determine if the triangles are congruent by SSS, SAS, ASA, AAS, or HL. If the triangles CANNOT be proven congruent, write NONE for the reason.
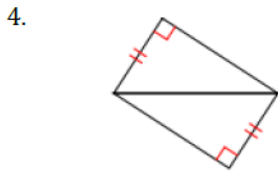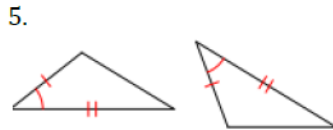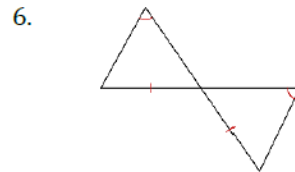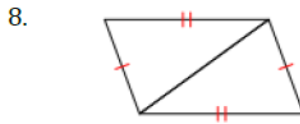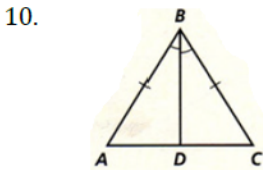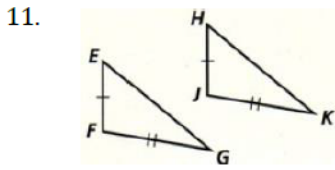2. If the triangles are congruent, complete the congruence statement with the name of the second triangle. Make sure the letters are in the correct order. If the triangles are NOT congruent write NONE.
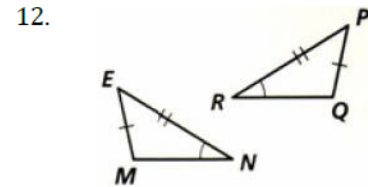
10.

Reason: _____

ΔABD ≅ Δ_____

11.

Reason: _____

ΔEFG ≅ Δ_____

12.

Reason: _____

ΔEMN ≅ Δ_____

13.

Reason: _____

$\triangle BAY \cong \triangle$ _____

14.

Reason: _____
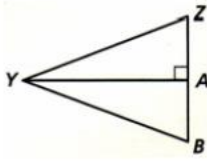
$\triangle CDE \cong \triangle$ _____

15.

Reason: _____

$\triangle LMK \cong \triangle$ _____

16.

Reason: _____

$\triangle NPR \cong \triangle$ _____

17.

Reason: _____

$\triangle STU \cong \triangle$ _____
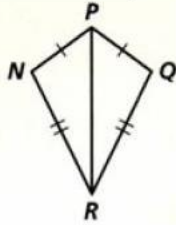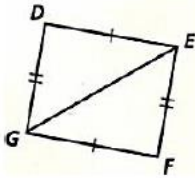
18.

Reason: _____

$\triangle BAY \cong \triangle$ _____
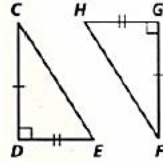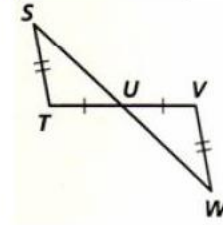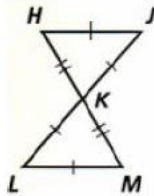
19.
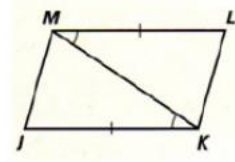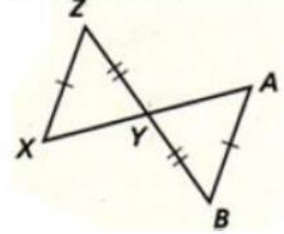
Reason: _____

$\triangle DEG \cong \triangle$ _____

20.
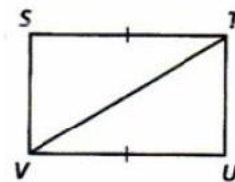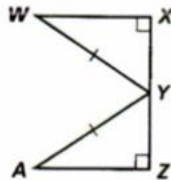
Reason: _____

$\triangle KLM \cong \triangle$ _____

21.

Reason: _____

$\triangle STV \cong \triangle$ _____

III. Apply given info. Are the triangles congruent? Complete the triangle congruence statement.

1. Determine if the triangles are congruent by SSS, SAS, ASA, AAS, or HL by applying the given information. If the triangles CANNOT be proven congruent, write NONE for the reason.
2. If the triangles are congruent, complete the congruence statement with the name of the second triangle. Make sure the letters are in the correct order.
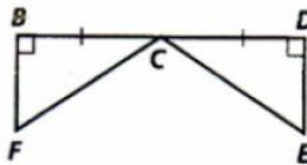
22. Y is the midpoint of $\overline{XZ}$

Reason: _____

$\triangle WXY \cong \triangle$ _____
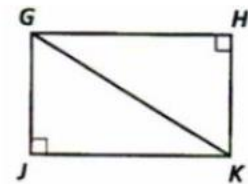
23. $\overline{BF} \cong \overline{DE}$
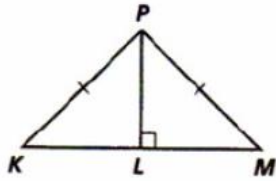
Reason: _____

$\triangle CDE \cong \triangle$ _____

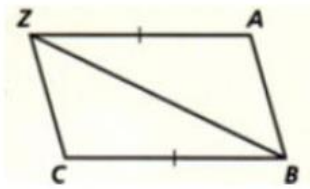24. $\overline{GJ} \parallel \overline{HK}$

Reason: _____

$\triangle GJK \cong \triangle$ _____
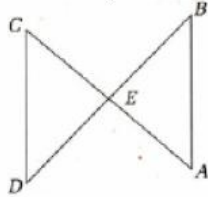
25. Hint: Apply the Base ∠s Thm.

Reason: _____

ΔLPK ≅ Δ_____

26. S is the midpoint of $\overline{NR}$

Reason:

_____

ΔNSQ ≅ Δ_____

27. ∠G ≅ ∠L

Reason: _____

ΔJKL ≅ Δ_____

28. $\overline{ZC}||\overline{AB}$; $\overline{ZA}||\overline{CB}$

Reason: _____

ΔABZ ≅ Δ_____

29.

Reason: _____

ΔTUV ≅ Δ_____

30.

Reason: _____

ΔPNM ≅ Δ_____

31. $\overline{CD} \cong \overline{AB}$; ∠B ≅ ∠D

Reason: _____

ΔCDE ≅ Δ_____

32. $\overline{JN} \cong \overline{LM}$; ∠N ≅ ∠M; $\overline{NK} \cong \overline{MK}$

Reason: _____

ΔJKN ≅ Δ_____

33. $\overline{AC} \cong \overline{BD}$; $\overline{AD} \cong \overline{BC}$

Reason: _____

ΔABC ≅ Δ_____

34. $\overline{SQ}$ and $\overline{PR}$ bisect each other

Reason: _____

ΔRST ≅ Δ_____
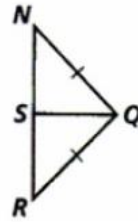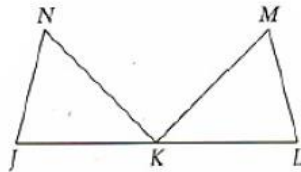
35. $\overline{GH}$ bisects ∠EGF; $\overline{EG} \cong \overline{FG}$

Reason: _____

ΔGEH ≅ Δ_____
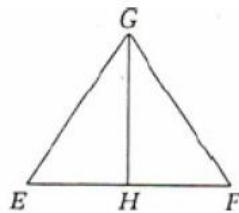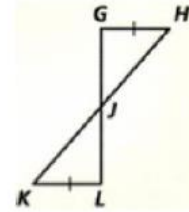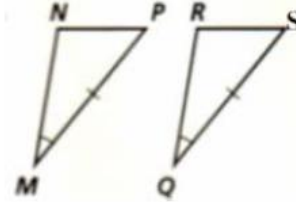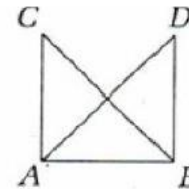
36. C is the midpoint of $\overline{AD}$; ∠B ≅ ∠E

Reason: _____

ΔABC ≅ Δ_____
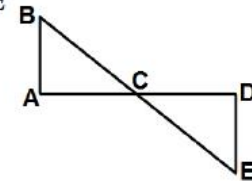
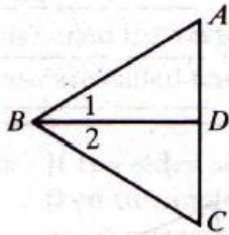IV. Proofs – will need to do on separate page.

1. Given: $\overrightarrow{DF}$ bisects $\angle EDG$;
   $\overline{DE} \cong \overline{DG}$
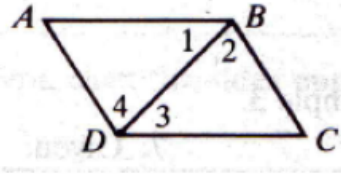   Prove: $\angle E \cong \angle G$
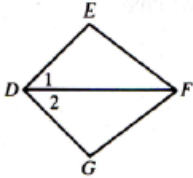
2. Given: $\overline{WY} \perp \overline{XZ}$; $\overline{XY} \cong \overline{YZ}$
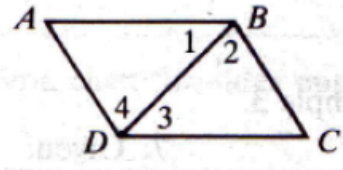   Prove: $\angle X \cong \angle Z$
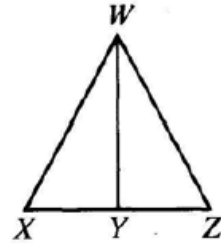
3. Given: $\overline{AB} \cong \overline{CB}$
   $\overline{BD}$ bisects $\angle ABC$
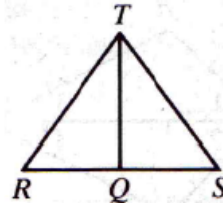   Prove: $\overline{BD}$ bisects $\overline{AC}$

4. Given: $\overline{AB} \cong \overline{DC}$; $\overline{AD} \cong \overline{BC}$
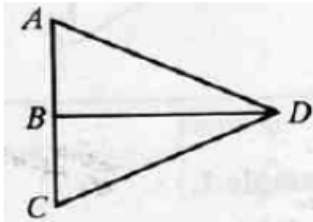   Prove: $\overline{AB} \parallel \overline{DC}$

5. G: $\angle A$ & $\angle C$ are rt $\angle$s
   $\overline{AD} \cong \overline{BC}$
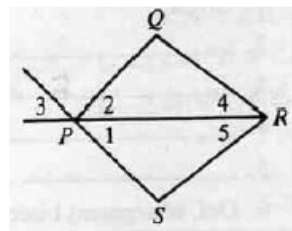   P: $\overline{AD} \parallel \overline{BC}$

6. Given: $\overline{RQ} \cong \overline{QS}$;
   $\overline{RT} \cong \overline{TS}$
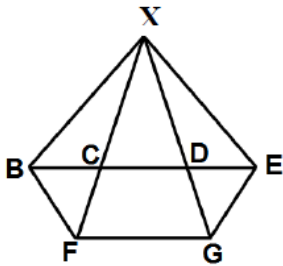   Prove: $\overline{TQ} \perp \overline{RS}$

7. Given: $\overline{AD} \cong \overline{CD}$
   $\overline{BD}$ bisects $\angle CDA$
   Prove: $\angle ABD$ & $\angle DBC$ are rt angles

8. Given: $\angle 4 \cong \angle 5$;
   $\overline{QR} \cong \overline{SR}$
   Prove: $\angle 2 \cong \angle 3$

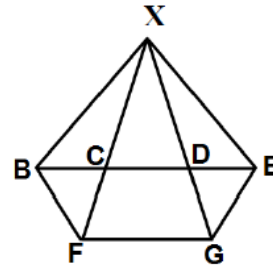V. Given two congruent segments, name two congruent angles.

1. $\overline{XC} \cong \overline{XD}$ 2. $\overline{FX} \cong \overline{GX}$ 3. $\overline{BC} \cong \overline{CF}$ 4. $\overline{GD} \cong \overline{DE}$

_____ ≅ _____   _____ ≅ _____   _____ ≅ _____   _____ ≅ _____
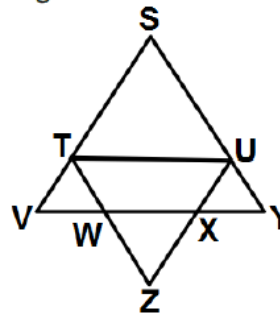
What theorem are you applying in all of these problems? _____

VI. Given two congruent angles name the two congruent segments.
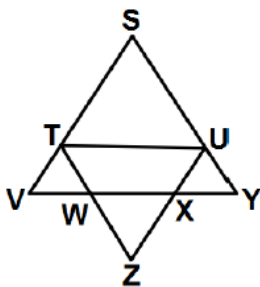
5. $\angle STU \cong \angle SUT$ 6. $\angle V \cong \angle TWV$ 7. $\angle UTZ \cong \angle TUZ$ 8. $\angle XWZ \cong \angle WXZ$

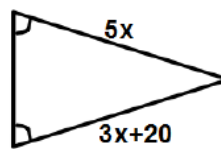_____ ≅ _____   _____ ≅ _____   _____ ≅ _____   _____ ≅ _____

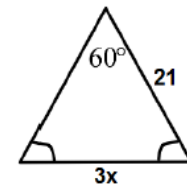What theorem are you applying in all of these problems? _____
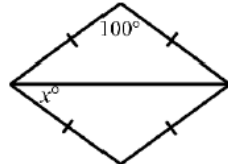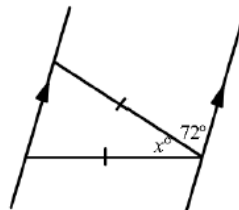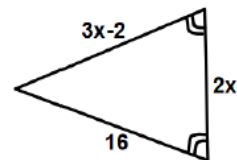
VII. Solve for x.
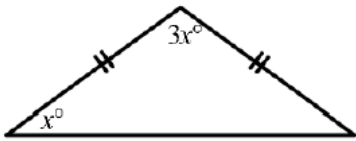
9.
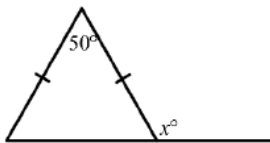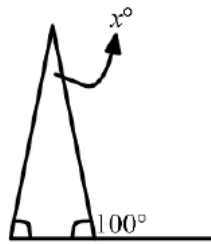

10.

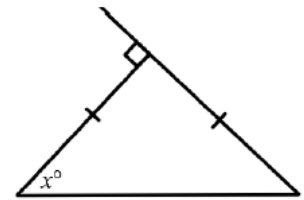
11.

12. Hint: the two triangles are congruent by SSS.

13.

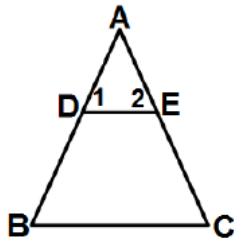14.

15.

$3x°$

$x°$

16.

$x°$

$100°$

17.

$x°$
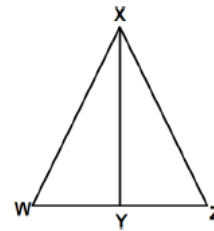
18. Given: $\overline{AB} \cong \overline{AC}$; $\angle B \cong \angle 2$; $\angle C \cong \angle 1$
    Prove: $\triangle ADE$ is isosceles

A

D $\boxed{1\quad 2}$ E

B C

19. Given: $\overline{XY}$ bisects $\overline{WZ}$; $\overline{XY} \perp \overline{WZ}$
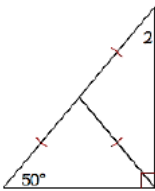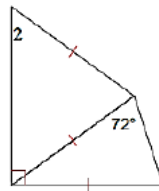   Prove: $\triangle WXZ$ is isosceles

X

W Y Z

VIII. Definition Details

20. Can a scalene triangle be a right triangle? _____

21. Can an isosceles triangle be obtuse? _____

22. Can an equiangular triangle be obtuse? _____

23. Can an acute triangle be isosceles? _____

24. Can a right triangle be obtuse? _____

25. Can an isosceles triangle be equilateral? _____

26. Can a triangle with 2 congruent angles be scalene? _____

IX. Angle Measures and Algebra Connections

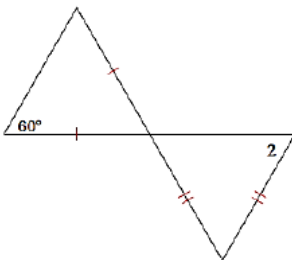1) $m\angle 2 = 3x + 13$

2
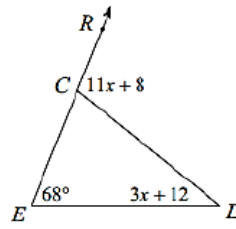
50°

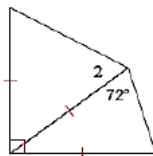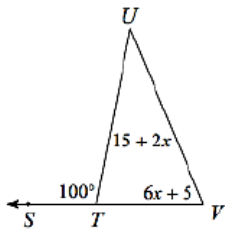2) $m\angle 2 = 6x - 6$

2

72°

3) $m\angle 2 = x + 70$

60°

2

4) $m\angle 2 = 10x - 7$

2

72°

5)

U

$15 + 2x$

$100°$ $6x + 5$

S   T   V

6)

R

C $11x + 8$

$68°$ $3x + 12$

E   D

7)

C

$5x + 10$

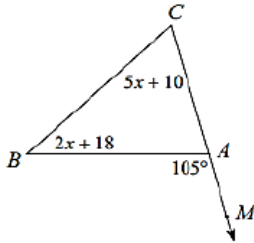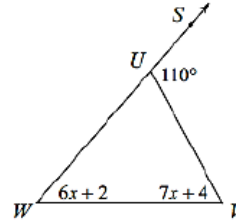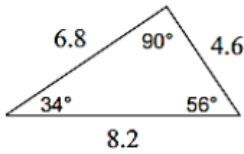$2x + 18$ A

B $105°$

M

8)

S

U $110°$

$6x + 2$ $7x + 4$

W   V

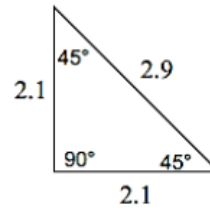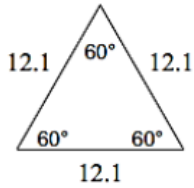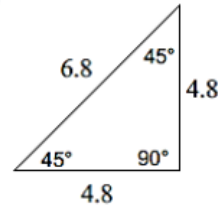## Classify each triangle by its angles and sides.

9)

6.8 $90°$ 4.6

$34°$ $56°$

8.2

10)

$45°$ 2.9

2.1

$90°$ $45°$

2.1

11)

12.1 $60°$ 12.1

$60°$ $60°$

12.1

12)

6.8 $45°$

4.8

$45°$ $90°$

4.8

13)

3.7 $57°$

2

$33°$

3.1

14)

2.8

$115°$ $38°$

3.7

$27°$ 5.5

15)

4.8 $90°$ 10.8

$66°$ $24°$

11.8

16)

$20°$ 4.3

2.3

$140°$ $20°$

2.3

Classify each triangle by its angles and sides. Equal sides and equal angles, if any, are indicated in each diagram.
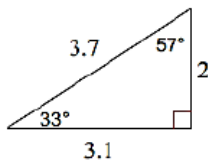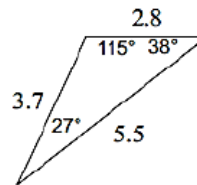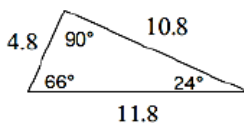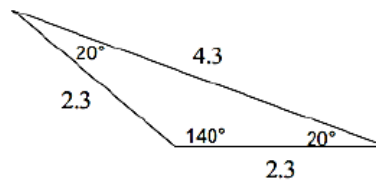
17)

18)

19)

20)

21)

22)

25)

30°

50°   6x + 14

26)

32°   6x + 1

63°

27)

−5 + 32x

40°

115°

28)

120°   x + 80

50°

8