GUIDED NOTES: Geometric Properties

⬤	Important Vocabulary	Picture
Vertical Angles: **congruent**	two angles that are directly across from each other and share a vertex $\angle 1+\angle 4$ $\angle 2+\angle 3$ $\angle 5+\angle 8$ $\angle 6+\angle 7$	
Linear Pair: **supplementary**	two angles that form a line $\angle 1+\angle 2$ $\angle 1+\angle 3$ $\angle 5+\angle 6$ $\angle 5+\angle 7$ $\angle 3+\angle 4$ $\angle 2+\angle 4$ $\angle 7+\angle 8$ $\angle 6+\angle 8$	
Corresponding Angles: **congruent**	two angles in the same position on different parallel lines $\angle 1+\angle 5$ $\angle 2+\angle 6$ $\angle 3+\angle 7$ $\angle 4+\angle 8$	
Alternate Interior Angles: **congruent**	two angles between parallel lines and on different sides of the transversal $\angle 3+\angle 6$ $\angle 4+\angle 5$	
Alternate Exterior Angles: **congruent**	two angles outside parallel lines and on different sides of the transversal $\angle 1+\angle 8$ $\angle 2+\angle 7$	
Consecutive Interior Angles: **supplementary**	two angles between parallel lines and on the same side of the transversal $\angle 3+\angle 5$ $\angle 4+\angle 6$	
Consecutive Exterior Angles: **supplementary**	two angles outside parallel lines and on the same side of the transversal $\angle 1+\angle 7$ $\angle 2+\angle 8$	

transversal

EX1.

$52°$
$4x - 12$
$52°$
$2x + 20$

corresponding
(congruent)

$4x - 12 = 2x + 20$
$\underline{-2x \qquad -2x}$
$2x - 12 = 20$
$\underline{+12 \quad +12}$
$\dfrac{2x}{2} = \dfrac{32}{2}$
$x = 16$

$4(16) - 12 = 52°$
$2(16) + 20 = 52°$

EX2.

$3x - 14$
$119°$
61

Consecutive
Interior
(supplementary)

$3x - 14 + 61 = 180$
$3x + 47 = 180$
$\underline{-47 \quad -47}$
$\dfrac{3x}{3} = \dfrac{133}{3}$
$x = 44.33$

$3(44.33) - 14 = 119°$

EX3.

$5x - 22$
$93°$
$93°$
$3x + 24$

alternate interior
(congruent)

$5x - 22 = 3x + 24$
$\underline{+22 \qquad +22}$
$5x = 3x + 46$
$\underline{-3x \quad -3x}$
$\dfrac{2x}{2} = \dfrac{46}{2}$
$x = 23$

$5(23) - 22 = 93°$
$3(23) + 24 = 93°$

EX4.
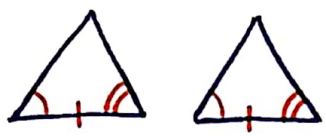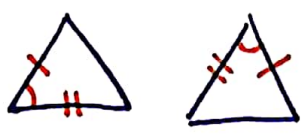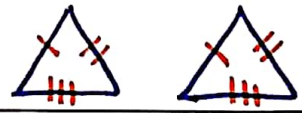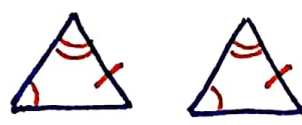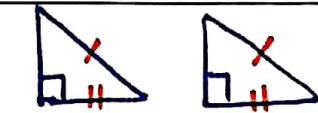
120
$4x + 28$
$120°$

alternate exterior
(congruent)

$120 = 4x + 28$
$\underline{-28 \qquad -28}$
$\dfrac{92}{4} = \dfrac{4x}{4}$
$23 = x$

$4(23) + 28 = 120°$

Triangle Congruence

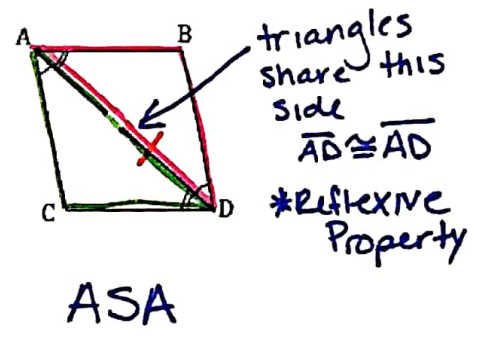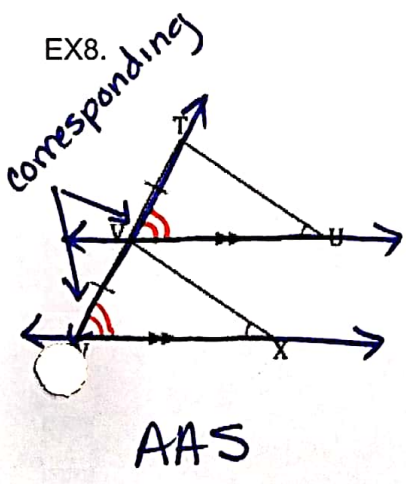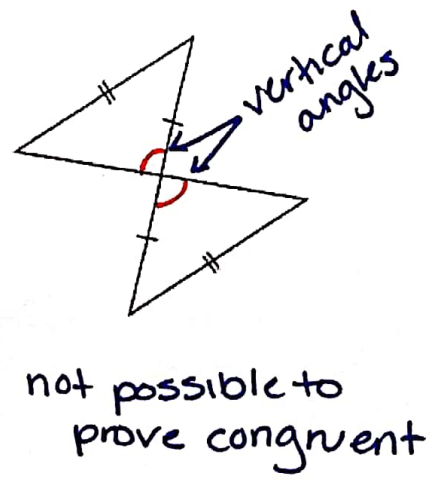| Name:	Picture	Definition	
Angle-Side-Angle (ASA)		two angles and the side between them of one triangle are congruent to two angles and the side between them of the other triangle	**The Donkey Theorem:** You <u>can't</u> travel (AAA) by Donkey (SSA) to triangle congruence!
Side-Angle-Side (SAS)		two sides and the angle between them of one triangle are congruent to two sides and the angle between them of the other triangle	
Side-Side-Side (SSS)		all three sides of one triangle are congruent to all three sides of the other triangle	
Angle-Angle-Side (AAS)		two angles and a side not between them of one triangle are congruent to two angles and a side not between them of the other triangle	
Hypotenuse-Leg (HL)		the hypotenuse and a leg of one right triangle are congruent to the hypotenuse and a leg of the other right triangle	

5.

SAS

EX6.

HL

EX7.

triangles share this side
$\overline{AD} \cong \overline{AD}$
*Reflexive Property

ASA

EX8. corresponding)

AAS

EX9.

vertical angles

not possible to prove congruent

EX10.

Reflexive Property

SSS