Geometry - 3.2 - Angles and Parallel Lines

ANGLE PAIRS WITH PARALLEL LINES

Corresponding Angles Postulate (Post. 3.1)	
Corresponding ∠'s are ≅ ∠1 ≅ ∠5 ∠2 ≅ ∠6 ∠3 ≅ ∠7 ∠4 ≅ ∠8	
Alternate Interior Angles Theorem (Thm. 3.1)	
AIA are ≅ ∠3 ≅ ∠6 ∠4 ≅ ∠5	
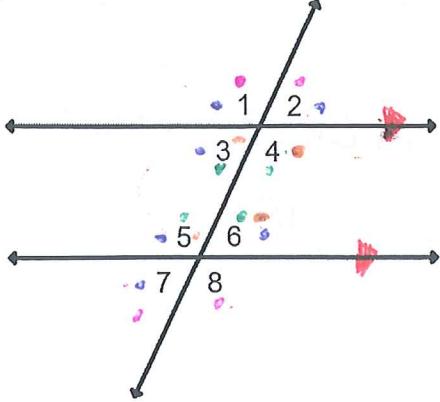
Alternate Exterior Angles Theorem (Thm. 3.2)	Consecutive Interior Angles Theorem (Thm. 3.3)
AEA are ≅ ∠1 ≅ ∠8 ∠2 ≅ ∠7	CIA add up to 180 $m\angle 4 + m\angle 6 = 180$ $m\angle 3 + m\angle 5 = 180$

Ex 1 - In the picture below, $\ell \parallel m$ and $m\angle 1 = 60$. Find the measure of the remaining angles, giving a valid justification for each measure.

Measure	Justification
$m\angle 1 = 60$	Given
$m\angle 2 = 60$	Corr ∠'s with ∠1
$m\angle 3 = 120$	Linear pair with ∠1
$m\angle 4 = 120$	AIA with ∠5
$m\angle 5 = 120$	CIA with ∠2
$m\angle 6 = 120$	AEA with ∠3
$m\angle 7 = 60$	Vertical ∠'s w/ ∠1
$m\angle 8 = 60$	Vertical ∠'s w/ ∠2
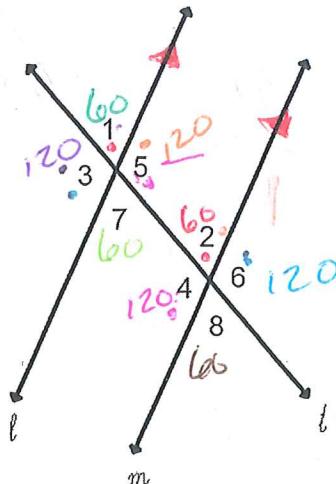
- The __perpendicular__ __Transversal__ Theorem (Thm. 3.4) states that if a line is perpendicular to one of two parallel lines, then it is __perpendicular__ to the other.
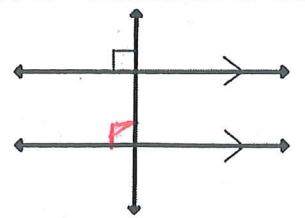
Ex 2 - What is the measure of ∠RIU?

$m\angle UIB = 50$ (Corresponding ∠'s)

$m\angle RIB = 40$ (CIA)

$m\angle UIB + m\angle RIB = m\angle RIU$ Angle Addition Postulate

$40 + 50 = \boxed{90}$

A   U 50°   X

Angle Addition Postulate

50

B

40

140°

L   R   Y

auxilary line

C

25 16   95
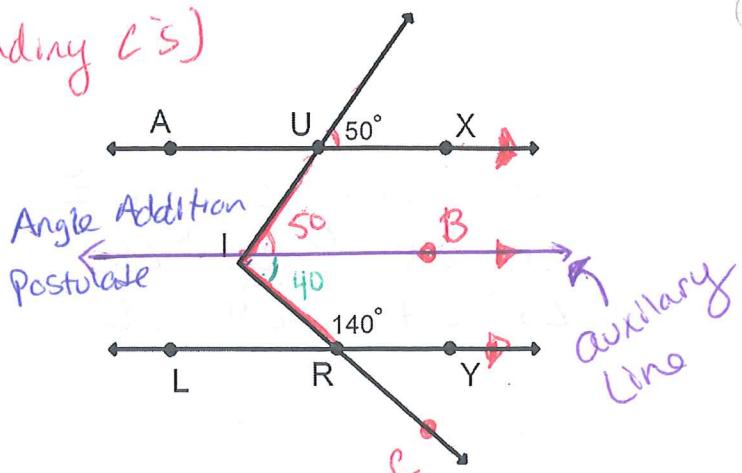
Ex 3 - Solve for x and y, then determine m∠FRE.

$4x - 15 = 3x + 10$ (AEA)

$-3x \qquad -3x$

$x - 15 = 10$

$+15 \quad +15$

$x = 25$

$3(25) + 10$

$75 + 10$

85

$5y + 5 = 85$

$-5 \quad -5$

$\dfrac{5y}{5} = \dfrac{80}{5}$

$y = 16$

85

4x-15

F (5x - 15)°

E

(3x + 10)° 85 I

R

85

(4y + 5)°

5y+5   M

∠FRE + 85 = 180 (CIA)

$-85 - 85$

∠FRE = 95