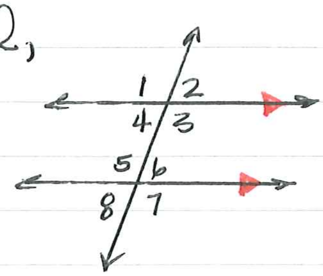
3-2 Angles and Parallel Lines

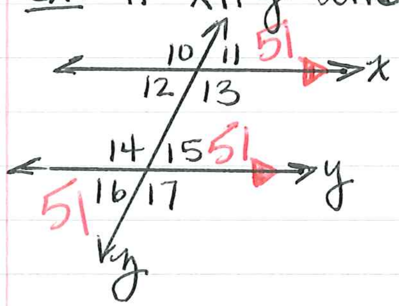
Corresponding Angles Postulate:

If two $\parallel$ lines are cut by a transversal, then each pair of corr. $\angle$s is $\cong$.



ex: $\angle 1 \cong \angle 5$, $\angle 2 \cong \angle 6$, $\angle 3 \cong \angle 7$, and $\angle 4 \cong \angle 8$.

ex: If $x \parallel y$ and $m\angle 11 = 51$. Find $m\angle 16$.

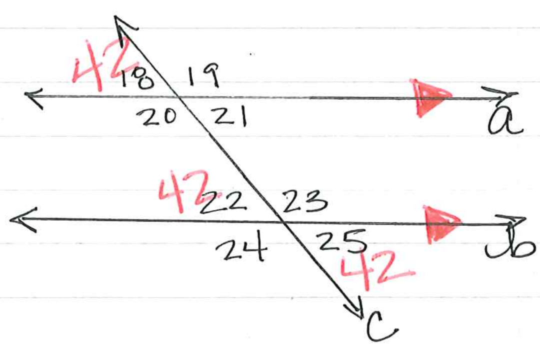


$\angle 11 \cong$	$\angle 15$	Corr. $\angle$s post.
$\angle 15 \cong$	$\angle 16$	Vert. $\angle$s thm.
$\angle 11 \cong$	$\angle 16$	transitive prop.

$m\angle 11 = m\angle 16$

$\boxed{m\angle 16 = 51}$

ex: If $a \parallel b$ and $m\angle 18 = 42$, then find $m\angle 25$.



$\angle 18 \cong \angle 22$, $\angle 22 \cong \angle 25$

so $\angle 18 \cong \angle 25$

$m\angle 18 = m\angle 25$

$\boxed{m\angle 25 = 42}$

Angle Pair Theorems:

Alternate Interior Angles: If two $\parallel$ lines are cut by transversal, then each pair of alt. int. $\angle$s are $\cong$. ($\angle 21 \cong \angle 22$; $\angle 20 \cong \angle 23$)

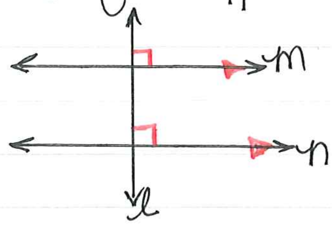
Alternate Exterior Angles: If 2 $\parallel$ lines are cut by a transversal, then each pair of alt. ext. $\angle$s are $\cong$. ($\angle 18 \cong \angle 25$; $\angle 19 \cong \angle 24$)

Consecutive Interior Angles: If 2 $\parallel$ lines are cut by a transversal, then each pair of cons. int. $\angle$s are suppl. ($m\angle 20 + m\angle 22 = 180$; $m\angle 21 + m\angle 23 = 180$)

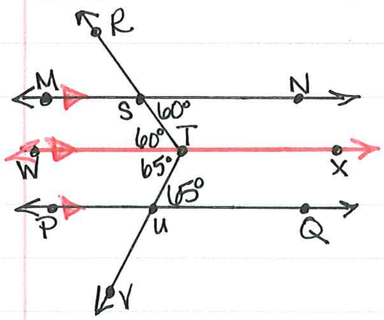
Perpendicular Transversal Theorem:

In a plane, if a line is $\perp$ to one of two $\parallel$ lines, then it is $\perp$ to the other.

ex: If $\ell \perp m$, then $\ell \perp n$.



ex: What is the measure of $\angle RTV$?



Draw a line through T that is $\parallel$ to $\overleftrightarrow{MN}$ & $\overleftrightarrow{PQ}$

$\angle STW \cong \angle NST$ Alt. Int. $\angle$s Thm.

$m\angle STW = m\angle NST$ Def. of $\cong$ $\angle$s.

$m\angle STW = 60$

$\angle UTW \cong \angle QUT$ Alt. Int. $\angle$s Thm.

$m\angle UTW = m\angle QUT$ Def. of $\cong$ $\angle$s.

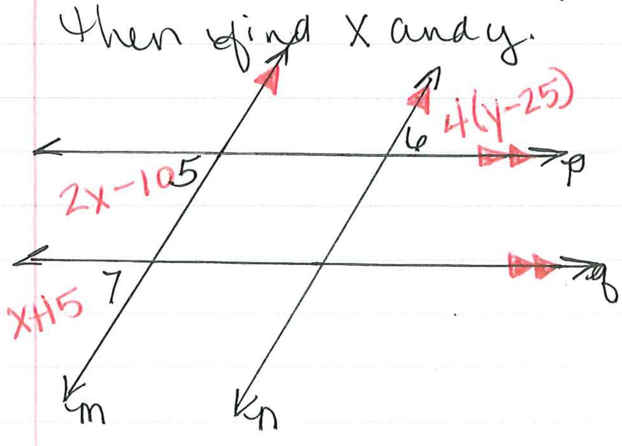
$mUTW = 65$

$m\angle RTV = m\angle STW + m\angle UTW$ $\angle$ Add. Post.

$m\angle RTV = 60 + 65$ Substitution

$\boxed{m\angle RTV = 125}$

ex: If $m\angle 5 = 2x-10$, $m\angle 6 = 4(y-25)$, and $m\angle 7 = x+15$, then find x and y.



$m\angle 5 \cong m\angle 7$ Corr. $\angle$s Post.

$2x - \cancel{10} = \cancel{x} + 15$

$-x \ \cancel{+10} \ \cancel{-x} + 10$

$\boxed{x = 25}$

$m\angle 5 \cong m\angle 6$ Alt. Ext. $\angle$s Thm.

$2(25) - 10 = 4(y-25)$

$50 - 10 = 4y - 100$

$\boxed{y = 35}$