Geometry – Mr. Bo
Unit 3 – Day 1 Notes

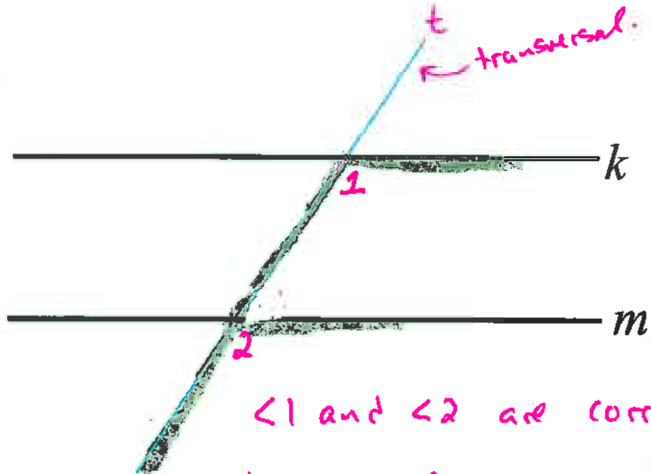
Name: ______________________
Date: ______________

Parallel Lines Cut By A Transversal

Corresponding Angles:

notice the "F" shape.

t ← transversal.

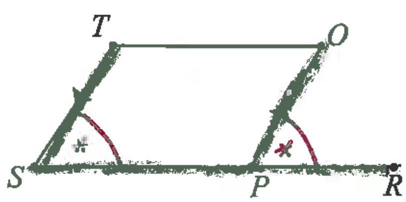


<1 and <2 are corresponding.

notice: $\angle 1 \cong \angle 2$.

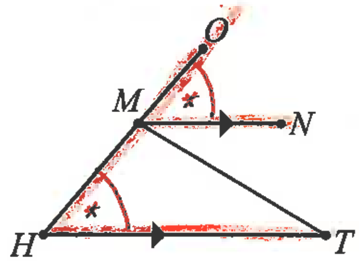
Theorem: If 2 parallel lines are cut by a transversal, then the corresponding angles are $\cong$.

1. Name the congruent **Corresponding Angles**



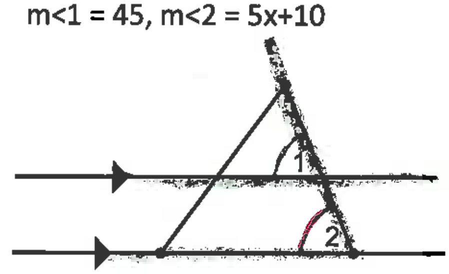
Angles: <TSR and <OPR

2. Name the congruent **Corresponding Angles**



Angles: $\angle OMN \cong \angle MHT$

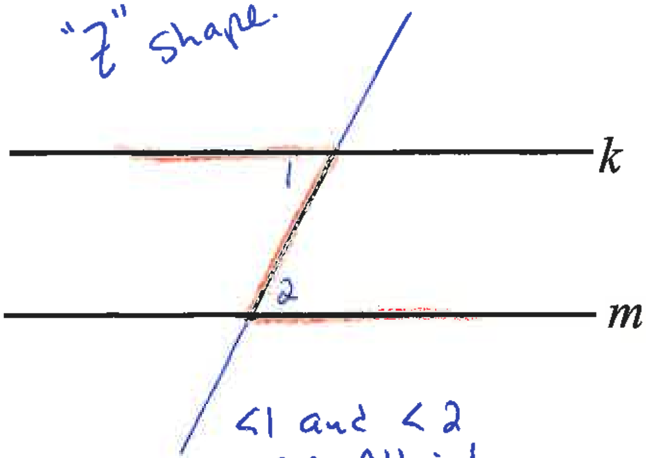
3. Solve for x:
m<1 = 45, m<2 = 5x+10



$m\angle 1 = m\angle 2$
$45 = 5x+10$
$35 = 5x$
$x = 7$

Alternate Interior Angles:

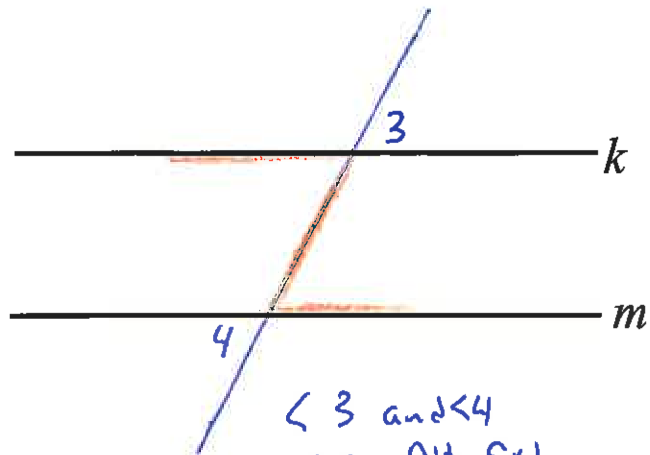
"Z" shape.



$\angle 1$ and $\angle 2$ are Alt. int.

$\Rightarrow \angle 1 \cong \angle 2$.

Alternate Exterior Angles:



$\angle 3$ and $\angle 4$ are Alt. Ext.

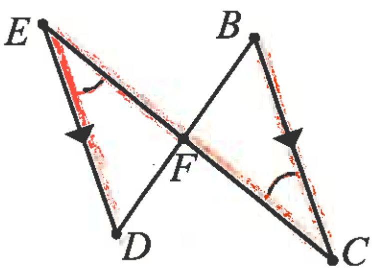
$\Rightarrow \angle 3 \cong \angle 4$

Theorem: If 2 Parallel lines are cut by a transversal.,

then the Alt int / Alt. Ext. angles are $\cong$.

Examples:

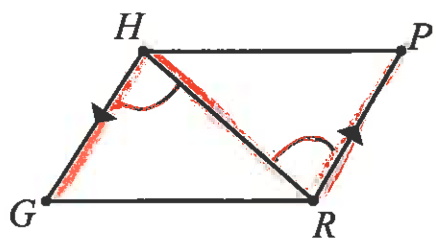
1. Name the congruent **Alternate interior Angles**



Angles: $\angle E \cong \angle C$

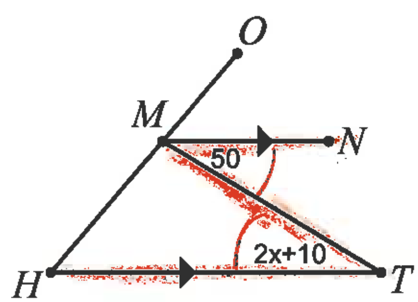
(Aslo $\angle D \cong \angle B$)

2. Name the congruent **Alternate Interior Angles**



Angles: $\angle GHR \cong \angle PRH$

3. Solve for x.



$m\angle NMT = m\angle HTM$

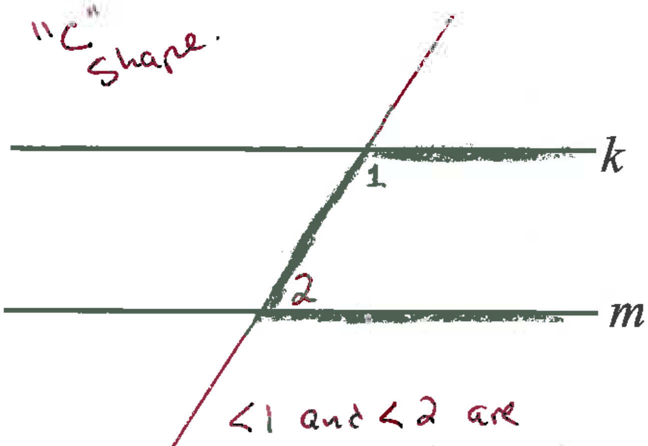
$50 = 2x + 10$

$40 = 2x$

$x = 20$

Same Side Interior Angles:

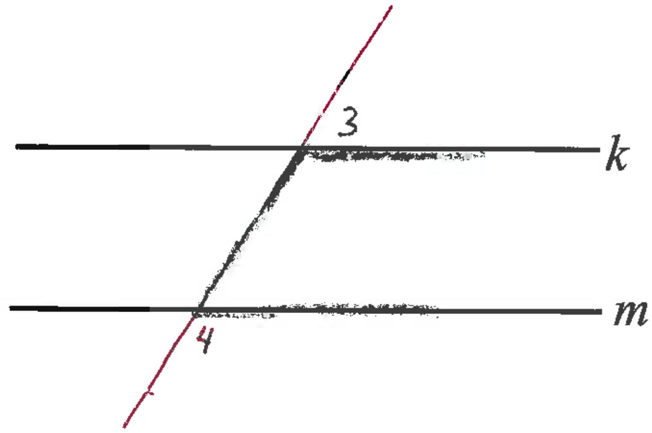
"C" shape.



∠1 and ∠2 are Same Side interior

$\Rightarrow m\angle 1 + m\angle 2 = 180°$
(they are Supplementary)

Same Side Exterior Angles:



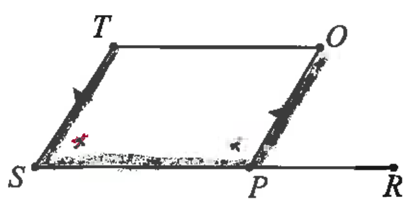
∠3 and ∠4 are same Side Ext.

$\Rightarrow m\angle 3 + m\angle 4 = 180°$

Theorem: If 2 Parallel lines are cut by a transversal, then the Same side int/Ext. angles are Supp..

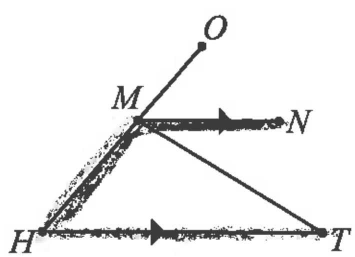
Examples:

1. Name the supplementary **Same Side Interior Angles**



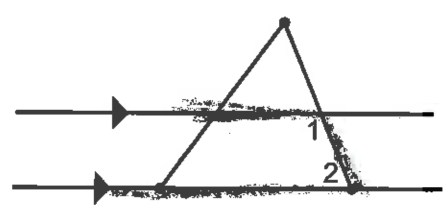
Angles: ∠TSR supp to. ∠OPR.

2. Name the supplementary **Same Side Interior Angles**



Angles: ∠NMH Supp. to ∠THM.

3. Solve for x:
m<1 = 2x+90, m<2 = 3x+10



$m\angle 1 + m\angle 2 = 180$
$2x+90 + 3x+10 = 180$
$5x + 100 = 180$
$5x = 80$
$x = 16$

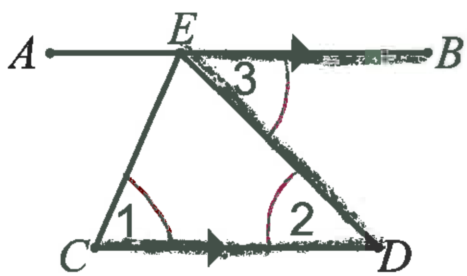
Parallel Line Proofs:

Example:

Given: $\overline{AB} // \overline{CD}$ → $\angle 2 \cong \angle 3$

$\angle 1 \cong \angle 2$

Prove: $\angle 1 \cong \angle 3$



Statement	Reason
① $\overline{AB} // \overline{CD}$	① Given
② $\angle 2 \cong \angle 3$	② // lines cut by trans. make alt. int $\angle$'s $\cong$.
③ $\angle 1 \cong \angle 2$	③ Given
④ $\angle 1 \cong \angle 3$	④ transitive.

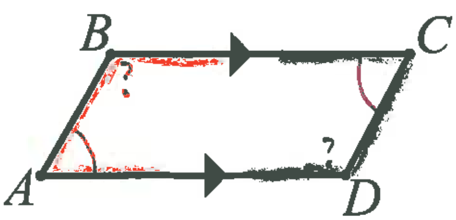
link.

Example:

Given: $\overline{BC} // \overline{AD}$ → use same side int $\angle$'s.

$\angle A \cong \angle C$

Prove: $\angle B \cong \angle D$



Given $\overline{BC} // \overline{AD}$ we get $\angle A$ supp. to $\angle B$ and $\angle D$ supp. to $\angle C$ because 2 // lines cut by a trans. make the same side interior $\angle$'s supplementary. Since $\angle A \cong \angle C$ is given we get $\angle B \cong \angle D$ because congruent angles have congruent supplements.