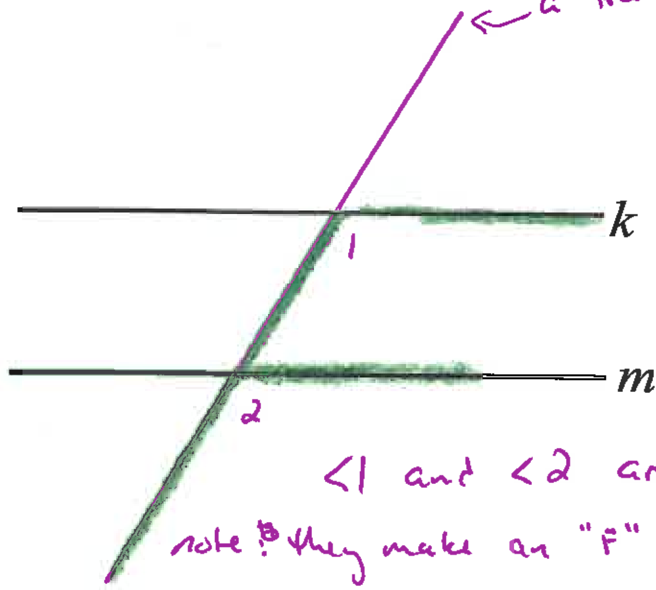
Geometry R – Mr. Bo
Unit 4 – Day 1 Notes

Name: notes.
Date: ____________

Parallel Lines Cut By A Transversal

Corresponding Angles:

← a transversal.



<1 and <2 are corresponding.

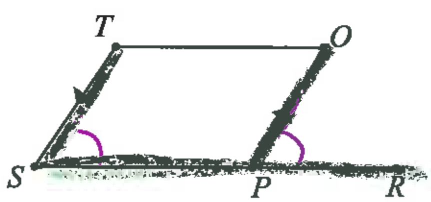
note: they make an "F" shape

Postulate: If 2 lines are parallel then the **Corresponding** angles are congruent.

<1 ≅ <2 in the picture above.

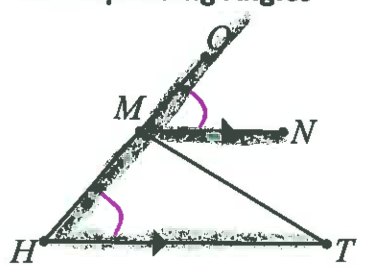
look for the "F"

1. Name the congruent **Corresponding Angles**



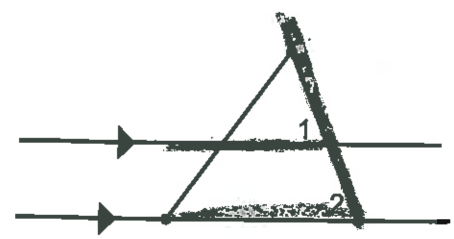
Angles: <TSP ≅ < OPR

2. Name the congruent **Corresponding Angles**



Angles: <OMN ≅ <MHT

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

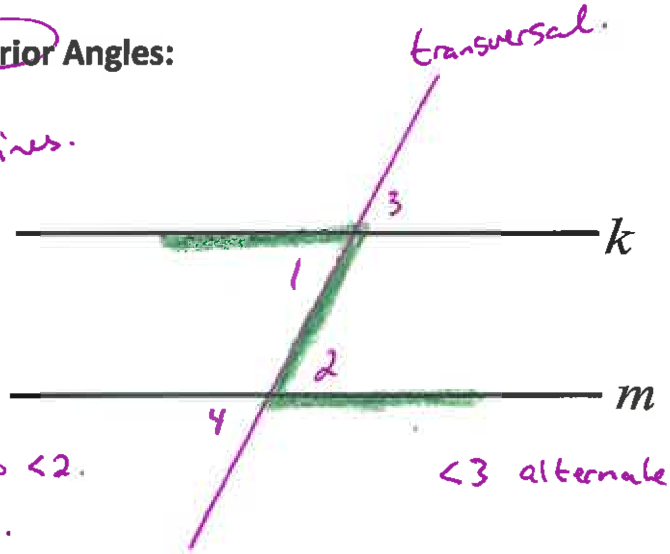


<1 ≅ <2
45 = 5x+10
35 = 5x
x = 7

Alternate Interior/Exterior Angles:

Sides of the transversal

to the parallel lines.



<1 alternate interior to <2.
make a "Z" shape.

<3 alternate exterior to <4

Theorem: If 2 lines are parallel, then the **Alternate Interior** angles are congruent. $\angle 1 \cong \angle 2$

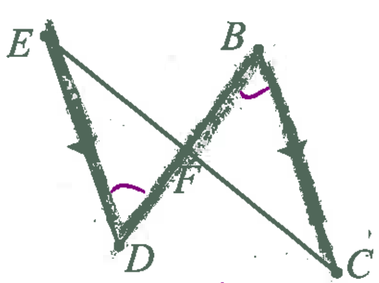
Theorem: If 2 lines are parallel, then the **Alternate Exterior** angles are congruent. $\angle 3 \cong \angle 4$

1. Explain how corresponding angles can be used to verify that the Alternate Interior/Exterior angle theorems are true.

In the picture above, $\angle 1 \cong \angle 3$ by vertical <'s.
Also, $\angle 3 \cong \angle 2$ by corr. <'s.
So, by transitive, $\angle 1 \cong \angle 2$.

look for the "Z" shape.

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

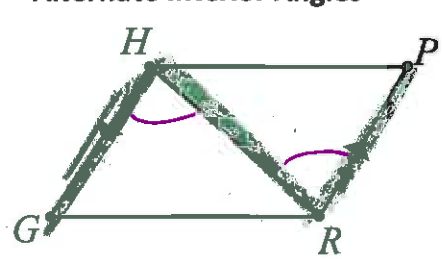


Angles: $\angle D \cong \angle B$

or

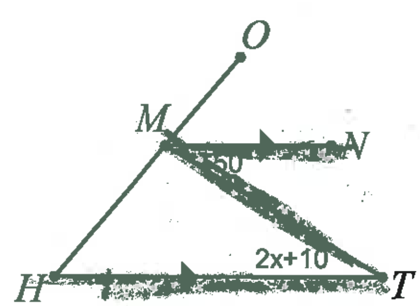
$(\angle E \cong \angle C)$

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



Angles: $\angle GHR \cong \angle PRG$.

4. Solve for x.



$\angle NMT \cong \angle HTM$

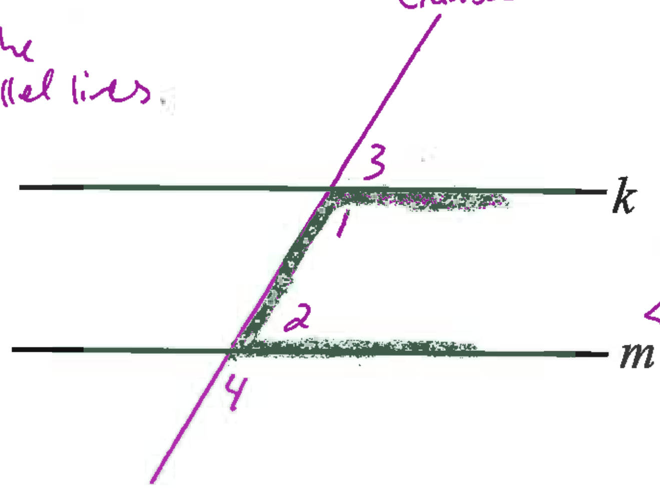
$50 = 2x + 10$

$40 = 2x$

$x = 20$

Same Side Interior/Exterior Angles:

of the transversal   to the parallel lines.



<1 Same side interior to <2. make a "C" shape.

<3 Same side exterior to <4

Theorem: If 2 lines are parallel, the **Same Side Interior** angles are supplementary. m<1+m<2 = 180

Theorem: If 2 lines are parallel, the **Same Side Exterior** angles are supplementary. m<3+m<4 = 180

1. Explain how corresponding angles can be used to verify that the Same Side Interior/Exterior angle theorems are true.

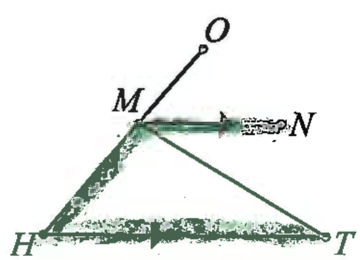
<1 supp. <3 by supp. < theorem. So m<1+m<3=180
Also, <3 ≅ <2 by corr. <'s theorem.
by substitution, m<1+m<2=180 which makes them supplementary.

look for the "C"

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

Angles: <TSP supp to <OPS.

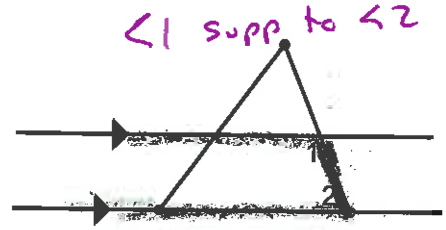
3. Name the supplementary **Same Side Interior Angles**



Angles: <NMH supp to <MHT

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

<1 supp to <2



m<1+m<2=180
2x+90+3x+10=180
5x+100=180
5x=80
x=16

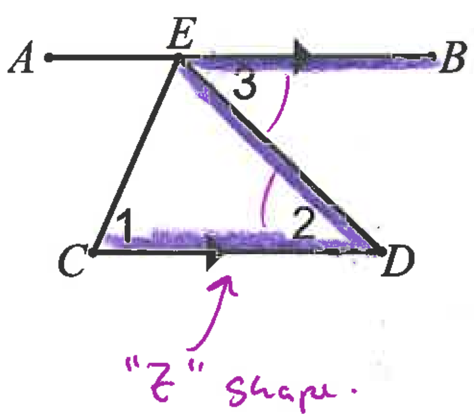
Parallel Line Proofs:

Example:

Given: $\overline{AB} // \overline{CD}$ $\to$ 2 ≅ <'s.

$\angle 1 \cong \angle 2$

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



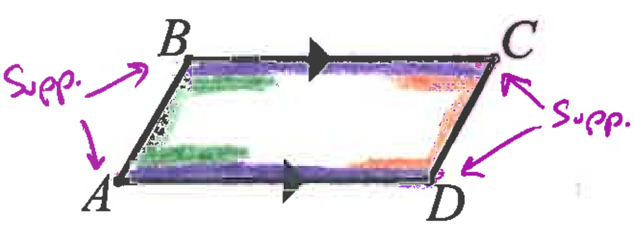
Statement	Reason
① $\overline{AB} \parallel \overline{CD}$	① Given
② $\angle 2 \cong \angle 3$	② 2 // lines cut by a trans. make alt. int <'s ≅.
③ $\angle 1 \cong \angle 2$	③ Given.
④ $\angle 1 \cong \angle 3$	④ transitive.

Example: A Paragraph Proof

Given: $\overline{BC} // \overline{AD}$

$\angle A \cong \angle C$

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



~~State~~

$\overline{BC} \parallel \overline{AD}$ is given. 2 // lines cut by a transversal makes same side interior <'s supplementary. this means that <A supp. <B and <C supp. <D. It is also given that <A ≅ <C. this makes <B ≅ <D because ≅ <'s have ≅ supplements