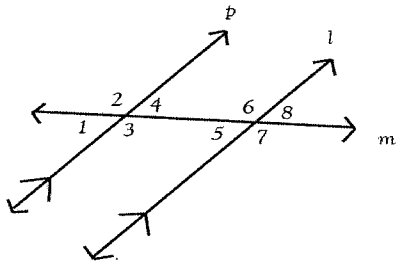
Proving Angle Relationships and Parallel Lines: Notes

Example 1:
Use Alternate Exterior Angles to prove **Alternate Interior Angles** are Congruent.

Given:
p//*l and m is a transversal of p and l* $\angle 1 \cong \angle 8$

Prove: $\angle 4 \cong \angle 5$

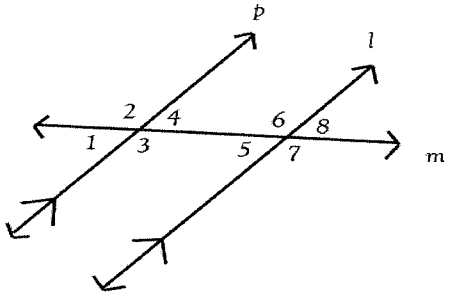


1. $p \parallel l$, $\angle 1 \cong \angle 8$	1. given
2. $\angle 1 \cong \angle 4$, $\angle 5 \cong \angle 8$	2. vertical $\angle$s are $\cong$
3. $\angle 8 \cong \angle 4$	3. Subs.
4. $\angle 4 \cong \angle 5$	4. Subs.

Example 2.
Prove **Consecutive Interior Angles** are supplementary.

Given: p//*l and m is a transversal of p and l*

Prove:
$\angle 3$ *and* $\angle 5$ *are supplementary*



1. $p \parallel l$ $\angle 1 \cong \angle 8$	1. given
2. $\angle 1 + \angle 3 = 180$	2. linear pairs are suppl.
3. $\angle 5 \cong \angle 8$	3. vertical $\angle$s are $\cong$
4. $\angle 1 \cong \angle 5$	4. transitive
5. $\angle 5 + \angle 5 = 180$	5. subst.
6. $\angle 3$ and $\angle 5$ are suppl.	6. def of suppl.

Example 3:

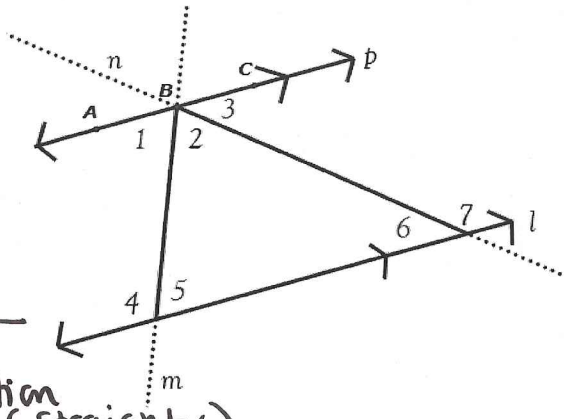
Prove the <u>Triangle Sum Theorem</u>
<u>(don't use it in the proof)</u>

Given:

$p // l$ *and* m *is a transversal of* p *and* l

Prove:

$m<5 + m<2 + m<6 = 180$



1. p // l	1. given
2. $\angle 1 + \angle 2 + \angle 3 = 180$	2. angle addition (straight $\angle$)
3. $\angle 1 \cong \angle 5$, $\angle 3 \cong \angle 6$	3. // lines form $\cong$ alt. int. $\angle$s.
4. $\angle 5 + \angle 2 + \angle 6 = 180$	4. Subst.

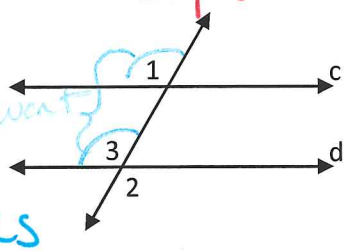
Corresponding Angles Converse Postulate:

- If corresponding angles are $\cong$ then the lines are parallel.

Proof of the Alternate Exterior Angles Converse Theorem:

- If alternate exterior angles are $\cong$ then the lines are parallel..

Given: $\angle 1 \cong \angle 2$
Prove: c ∥ d

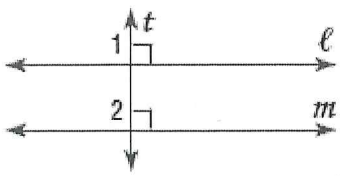


1. $\angle 1 \cong \angle 2$	1. given
2. $\angle 2 \cong \angle 3$	2. vertical $\angle$s are $\cong$
3. $\angle 1 \cong \angle 3$	3. Substitution
4. c // d	4. $\cong$ corr. $\angle$s form // lines

Proof of:

- If two lines are perpendicular to the same line, then they are parallel.

Given: $l \perp t$ *and* $m \perp t$
Prove: $l \parallel m$



1. $l \perp t$ and $m \perp t$	1. given
2. $\angle 1 = 90°$, $\angle 2 = 90°$	2. def of $\perp$
3. $\angle 1 \cong \angle 2$	3. Substitution
4. l // m	4. $\cong$ corr. $\angle$s form // lines.