

UNIT 1
ASSIGNMENT #15

Working with Proofs with Transversals and Parallel lines

LINEAR PAIR POSTULATE:

If two angles are a linear pair, then they are supplementary (add to 180).

VERTICAL ANGLE THEOREM:

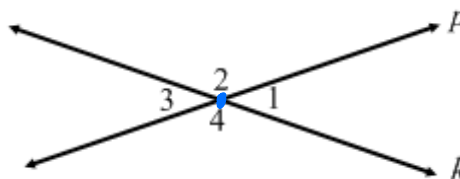
If two angles are vertical angles, then they are congruent.

We already know this property about vertical angles; we must now show that it is true. We cannot assume anything. We all know what happens when you assume. As you write a proof, you will make statements that tell what you know, and then you must justify each of those statements.

1. Complete the following proof:

Given: Lines k and p intersect at a given point.

Prove: $m\angle 1 = m\angle 3$



<u>STATEMENT</u>	<u>REASON</u>
① Lines k and p intersect @ a given point	① given
② $\angle 1 \cong \angle 3$.	② Vertical angles
③ $m\angle 1 = m\angle 3$	③ Defn of vertical angles

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CORRESPONDING ANGLES POSTULATE:

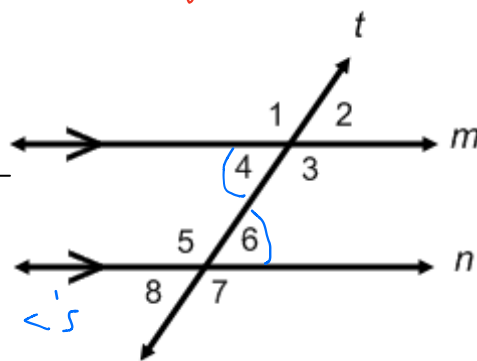
Given two parallel lines cut by a transversal, corresponding angles are congruent.

ALTERNATE INTERIOR ANGLES THEOREM:

Given two parallel lines cut by a transversal, alternate interior angles are congruent.

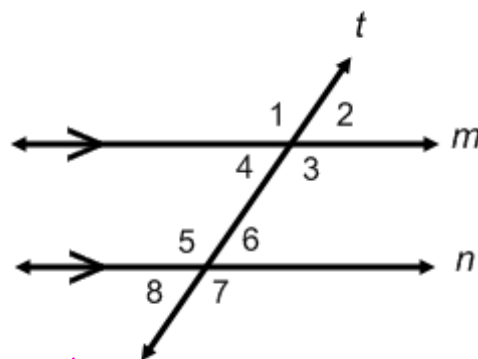
2. Given: Line m is parallel to line n with transversal t .
Prove: $m\angle 4 = m\angle 6$

<u>STATEMENT</u>	<u>REASON</u>
① Line m is parallel to line n w/ transversal t	① given
② $\angle 4 \cong \angle 6$	② alternate interior \angle 's
③ $m\angle 4 = m\angle 6$	③ Defn of alt. interior \angle 's



3. Given: Line m is parallel to line n with transversal t .
Prove: $m\angle 1 + m\angle 6 = 180^\circ$

<u>Statement</u>	<u>Reason</u>
① Line m is parallel to line n w/ transversal t	① Given
② $\angle 1 \cong \angle 3$	② Vertical angles
③ $m\angle 1 = m\angle 3$	③ Defn of vertical \angle 's
④ $\angle 3$ & $\angle 6$ supplementary	④ Consecutive interior \angle 's
⑤ $m\angle 3 + m\angle 6 = 180$	⑤ Def of supplementary \angle 's
⑥ $m\angle 1 + m\angle 6 = 180$	⑥ Substitution



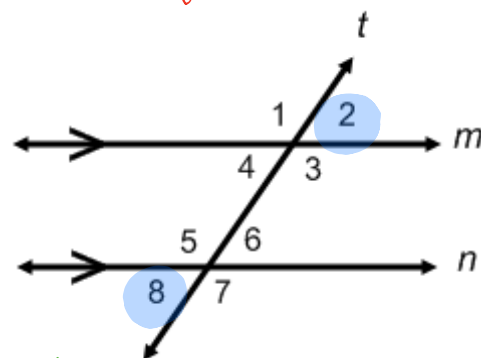
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ALTERNATE EXTERIOR ANGLES THEOREM:

Given two parallel lines cut by a transversal, alternate exterior angles are Congruent.

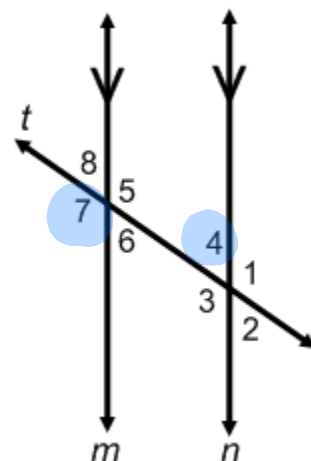
4. Given: Line m is parallel to line n with transversal t .
Prove: $m\angle 2 = m\angle 8$



Statement	Reason
① Line m is parallel to line n w/ transversal t .	① given
② $m\angle 2 \cong m\angle 8$	② alt. exterior \angle 's
③ $m\angle 2 = m\angle 8$	③ Def alt. exterior \angle 's

5. Given: Line m is parallel to line n with transversal t .
Prove: $m\angle 4 + m\angle 7 = 180^\circ$

Statement	Reason
① line m is \perp to line n w/ transversal t	① Given
② $\angle 7 \cong \angle 5$	② vertical \angle 's
③ $m\angle 7 = m\angle 5$	③ Def vertical \angle 's
④ $\angle 4$ & $\angle 5$ supplementary	④ Consecutive int. \angle 's
⑤ $m\angle 4 + m\angle 5 = 180$	⑤ Defn. consecutive int. \angle 's
⑥ $m\angle 4 + m\angle 7 = 180$	⑥ Substitution



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SAME SIDE INTERIOR ANGLES THEOREM:

Given two parallel lines cut by a transversal, same side interior angles are Supplementary.

6. Given: Line m is parallel to line n with transversal t .
Prove: $m\angle 4 + m\angle 5 = 180^\circ$

Statement	Reason
① Line m is \parallel to line n by transversal t	① Given
② $\angle 4$ & $\angle 5$ are supplementary	② Same Side Interior \angle s
③ $m\angle 4 + m\angle 5 = 180$	③ Defn of same side interior

