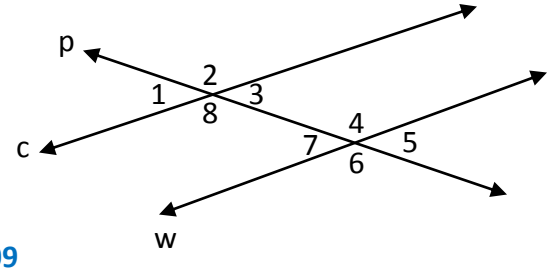
2.5 Parallel Line Converse Theorems



Bell Work:

Given: m<1 = 3x + 35
m<5 = 7x – 13
Find the measure of <8.

3x + 35 = 7x – 13
-4x = -48
X = 12

m<1 = m<5 = 3(12) + 35 = 71
m<8 = 180 – m<1 = 180 – 71 = 109

The **converse** of a conditional statement written in the form "If p, then q." is the statement written in the form "If q, then p."

The converse is a new statement that results when the hypothesis and conclusion of the conditional statement are interchanged.

Even if the original conditional is true, there is no guarantee that the converse will be true.

Write the converse of each of the following. If the conditional is true, is the converse true?

1. If I get something, then I like it.
   If I like something, then I get it.
2. If something is a plane, then it can fly.
   If something can fly, then it is a plane.

Again we must begin with a **postulate**.

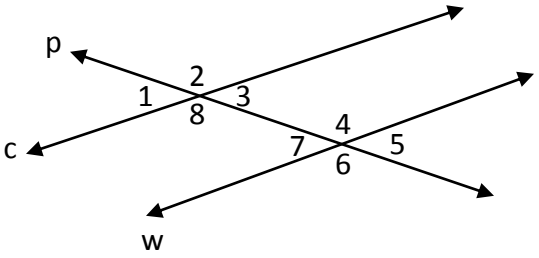
Remember that a **postulate** is a statement that is accepted as true because no counterexample has ever been found.

Corresponding Angle Converse Postulate

If two lines intersected by a transversal form congruent corresponding angles, then the lines are parallel.

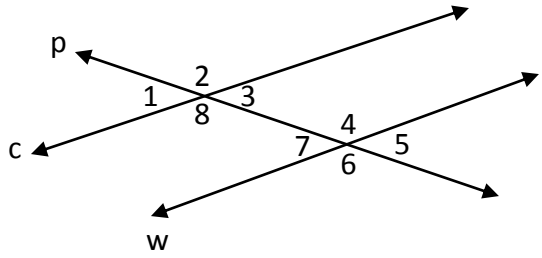
Given: <1 ≅ <7, <8 ≅ <6
<2 ≅ <4, <3 ≅ <5

Conclusion: c||w



Alternate Interior Angle Converse Theorem

If two lines intersected by a transversal form congruent alternate interior angles, then the lines are parallel.



Given: **<3 ≅ <7**

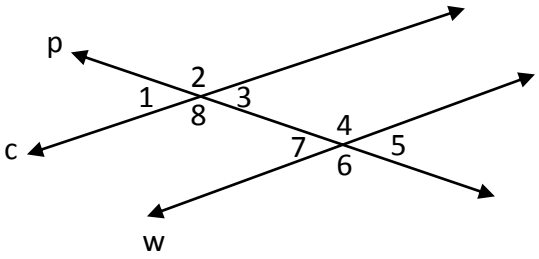
Prove: c||w

Proof:

Statements	Reasons
1. <3 ≅ <7	**1. Given**
2. <7 ≅ <5	**2. Vertical Angle Theorem**
3. <3 ≅ <5	**3. Transitive Property**
4. c||w	**4. Corresponding Angles Converse Theorem**

Alternate Exterior Angle Converse Theorem

If two lines intersected by a transversal form congruent alternate exterior angles, then the lines are parallel.



Given: **<1 ≅ <5**

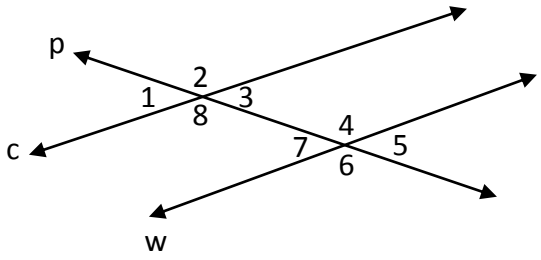
Prove: c||w

Proof:

Statements	Reasons
1. <1 ≅ <5	**1. Given**
2. <5 ≅ <7	**2. Vertical Angle Theorem**
3. <1 ≅ <7	**3. Transitive Property**
4. c||w	**4. Corresponding Angles Converse Theorem**

Same-Side Interior Angle Converse Theorem

If two lines intersected by a transversal form supplementary same-side interior angles, then the lines are parallel.



Given: **<8 and <7 are supplementary**

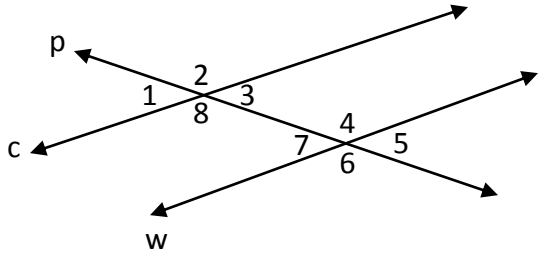
Prove: c||w

Proof:

Statements	Reasons
1. <8 and <7 are supplementary	1. Given
2. <1 and <8 are supplementary	2. Linear Pair Postulate
3. <1 ≅ <7	3. Congruent Supplements Theorem
4. c||w	4. Corresponding Angles Converse Theorem

Same-Side Exterior Angle Converse Theorem

If two lines intersected by a transversal form supplementary same-side exterior angles, then the lines are parallel.



Given: **<1 and <6 are supplementary**

Prove: c||w

Proof:

Statements	Reasons
1. <1 and <6 are supplementary	1. Given
2. <1 and <8 are supplementary	2. Linear Pair Postulate
3. <6 ≅ <8	3. Congruent Supplements Theorem
4. c||w	4. Corresponding Angles Converse Theorem