Criss Cross Applesauce
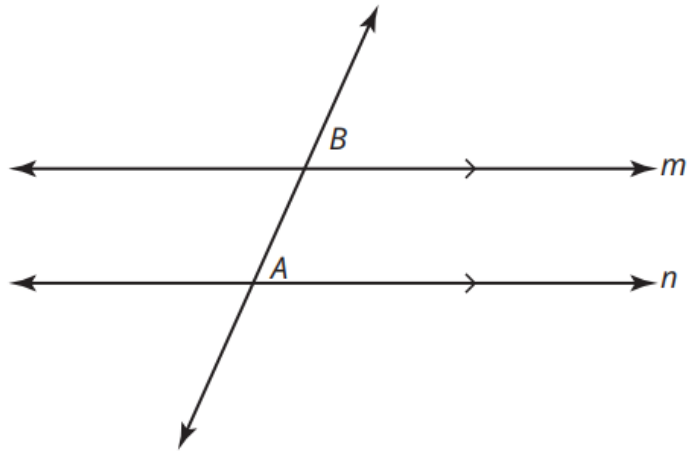
You may recall that you can use translations to show that corresponding angles are congruent.

1. **Consider parallel lines *m* and *n* with a pair of corresponding angles, ∠A and ∠B.**

   a. **Use patty paper to translate one of the corresponding angles so that it lies on top of the other corresponding angle. Identify the line of translation and describe the distance and direction of the translation.**

A transversal is a line that intersects two or more other lines.

Corresponding angles are two non-adjacent angles that lie on the same side of the transversal, one angle on the outside of the lines and one angle on the inside of the lines.

Alternate interior angles are two non-adjacent angles that lie between the two lines and on opposite sides of a transversal.

b. **What does this translation demonstrate about corresponding angles?**

2. **Describe how you can use a patty paper translation and what you know about vertical angles to demonstrate that alternate interior angles are congruent.**

Because your conjecture has been proved to be true, you can now refer to it as a theorem. The **Corresponding Angles Theorem** states: "If two parallel lines are intersected by a transversal, then corresponding angles are congruent."
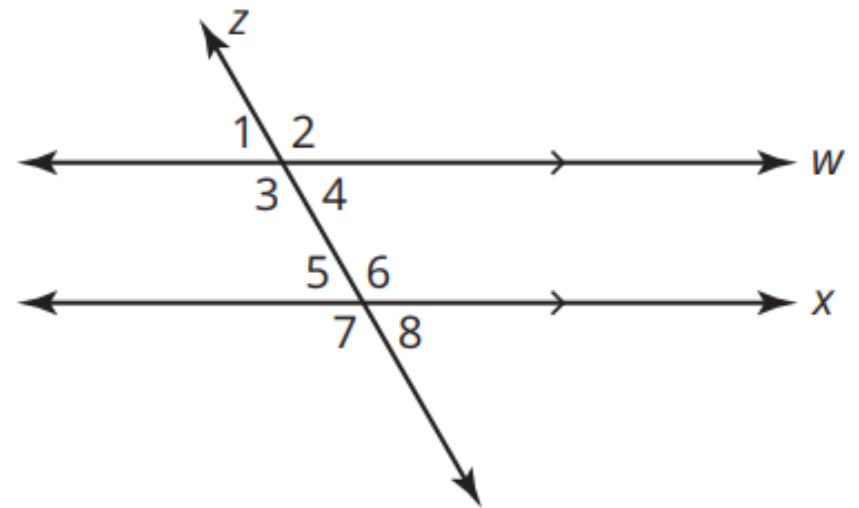
Because your conjecture has been proved to be true, you can now refer to it as a theorem. The **Corresponding Angles Converse Theorem** states: "If two lines intersected by a transversal form congruent corresponding angles, then the lines are parallel."
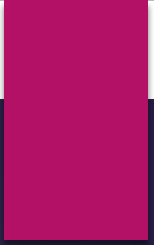
Consider the Given and Prove statements and the diagram.

Given: $w \parallel x$ and z is a transversal.

Prove: Same-side interior angles are supplementary angles.

1. **Cut out and use the statements and reasons located at the end of the lesson to prove your conjecture. Organize the statements and reasons to form a flow-chart proof of this theorem.**

m∠1 + m∠3 = 180°
Definition of supplementary angles

m∠1 = m∠5
Definition of congruent angles

m∠3 + m∠5 = 180°
Substitution Property
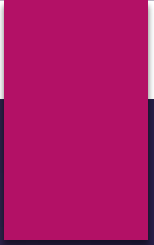
∠1 ≅ ∠5
Corresponding Angle Theorem

∠1 and ∠3 are supplementary.
Linear Pair Postulate

∠5 and ∠3 are supplementary.
Definition of supplementary angles

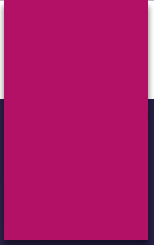∠1 and ∠3 are a linear pair.
Definition of linear pair

$w \parallel x$
Given

Because your conjecture has been proved to be true, you can now refer to it as a theorem. The **Same-Side Interior Angles Theorem** states, "If two parallel lines are intersected by a transversal, then the interior angles on the same side of the transversal are supplementary."
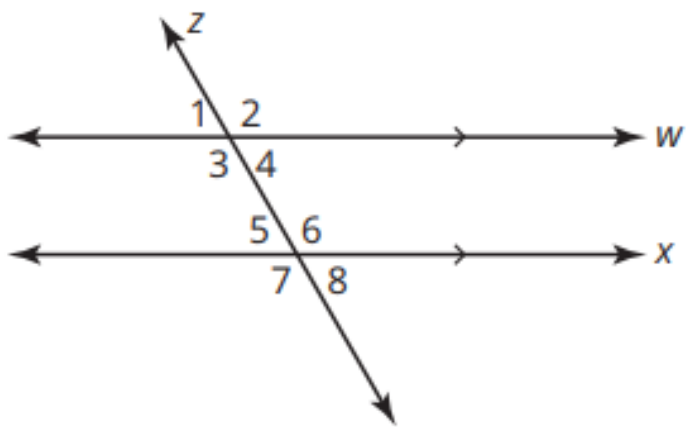
Given: $w \parallel x$ and z is a transversal.

Prove: Alternate interior angles are congruent.

Because your conjecture has been proved to be true, you can now refer to it as a theorem. The **Alternate Interior Angles Theorem** states: "If two parallel lines are intersected by a transversal, then the alternate interior angles are congruent."

Because your proof plans demonstrate that the statements can be proved true, you can now refer to these as theorems. The **Alternate Exterior Angles Theorem** states: "If two parallel lines are intersected by a transversal, then the alternate exterior angles are congruent." The **Same-Side Exterior Angles Theorem** states: "If two parallel lines are intersected by a transversal, then the same-side exterior angles are supplementary."