Geometry A   Name: ______________________________

3.3: Proving Lines Parallel   Date: __________________ Period: _______

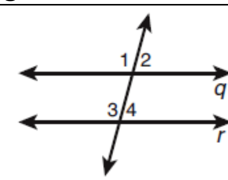
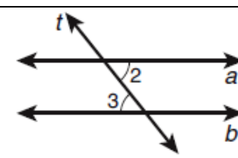
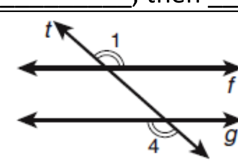
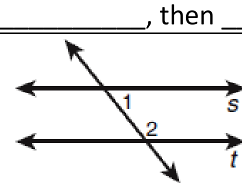
- I can prove lines are parallel.
  - I can use the corresponding angles converse
  - I can use the alternate interior angles converse.
  - I can use the alternate exterior angles converse.
  - I can use the consecutive interior angles converse.

You may have noticed that the postulates and theorems that we've studied so far have been written in the form "If *p*, then *q*." The **converse** of such a statement *switches the order of the parts of the statement* and has the form "If *q*, then *p*." The **converse** of a postulate or theorem may or may not be true, just as the **converse** of a mathematical statement may or may not be true.

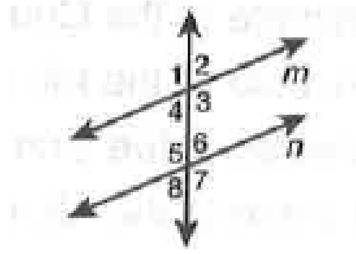
Mathematical Example:

Statement	Write the *converse* of the Statement	*Is the converse __always__ true?*
If $x=2$, ***then*** $3x=6$		
If $x=2$ and $y=3$, ***then*** $x+y=5$		

The **converse** of the Corresponding Angles Postulate is accepted as **true**, and this makes it possible to prove that the **converses** of the Alternate Interior Angle Theorem, Alternate Exterior Angle Theorem, and Consecutive Interior Angle Theorem are also true.

Converse	**In words…**	**Diagram**
Corresponding Angles Converse	If two lines are cut by a transversal so that corresponding angles are ______________, then the lines are ______________.	 If $\angle 1 \cong \angle 3$, then $q \parallel r$
Alternate Interior Angles Converse	If two lines are cut by a transversal so that alternate interior angles are ______________, then the lines are ______________.	 If __________, then ______
Alternate Exterior Angles Converse	If two lines are cut by a transversal so that alternate exterior angles are ______________, then the lines are ______________.	 If __________, then ______
Consecutive Interior Angles Converse	If two lines are cut by a transversal so that consecutive interior angles are ______________, then the lines are ______________.	 If ______________, then ______

For questions 1 – 4, use the given information to explain why $m \parallel n$.



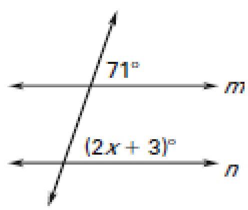
1. $\angle 1 \cong \angle 7$ ____
2. $m\angle 4 + m\angle 5 = 180°$ ____
3. $\angle 5 \cong \angle 3$ ____
4. $\angle 8 \cong \angle 4$ ____

5. If $m\angle 1 = 47°$ and $m\angle 5 = 49°$, are the lines parallel? Explain.

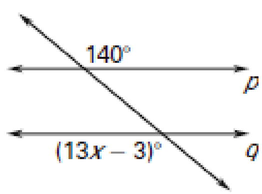
6. If $m\angle 3 = 119°$, what does the measure of $\angle 6$ need to be to prove $m \parallel n$?

Example 1: Find value of x that makes line parallel.

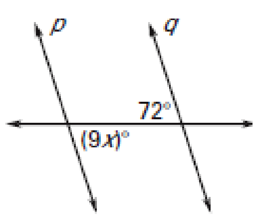
a) Find the value of *x* that makes $m \parallel n$. Explain your reasoning.



b) Find the value of *x* that makes $p \parallel q$. Explain your reasoning.



c) Find the value of *x* that makes $p \parallel q$. Explain your reasoning.



d) Find the value of *x* that makes $p \parallel q$. Explain your reasoning.