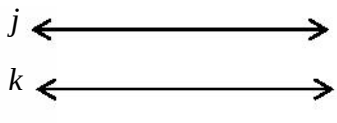
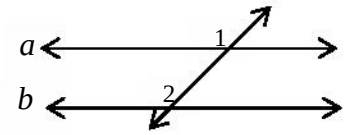
Objective: Write proofs to prove that lines are parallel

- In the figure below (left), can we assume that $j \parallel k$? _____ Why? _____
- In the figure below (right), if $\angle 1 \cong \angle 2$, then is $a \parallel b$? _____ Why? _____





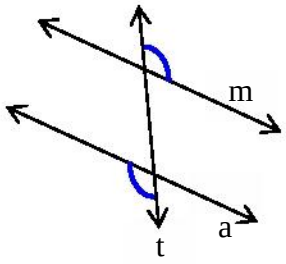
Recall that a hypothetical statement is a statement with a hypothesis and a conclusion, e.g., "if you live in Thousand Oaks, then you live in California." The part that follows "if" is called a hypothesis; the part that follows the "then" part is called the conclusion. Whenever we flip the hypothesis and the conclusion, we create something called a _____. Sometimes the converse is true, but other times it is not. For example, the converse of the statement above would be "if you live in California, then you live in Thousand Oaks", which would not necessarily be true. Postulates and theorems have converses, as well, and they can be used as reasons for proofs.

In this lesson, we will be proving that lines are parallel by using the following converses:

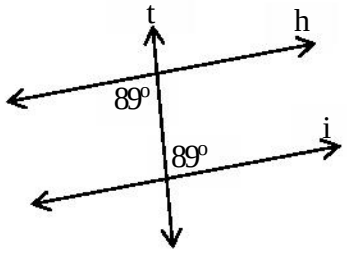
Corresponding Angles **Converse** Post.	If *corresponding angles* are _____, then the lines are _____.
Alternate Interior Angles **Converse** Thm.	If *alternate interior angles* are _____, then the lines are _____.
Alternate Exterior Angles **Converse** Thm.	If *alternate exterior angles* are _____, then the lines are parallel.
Consecutive Interior Angles **Converse** Thm.	If *consecutive interior angles* are _____, then the lines are parallel.
	If two lines are perpendicular to the same line, then they are parallel.

IMPORTANT: Use these when you are trying to prove that lines are parallel!

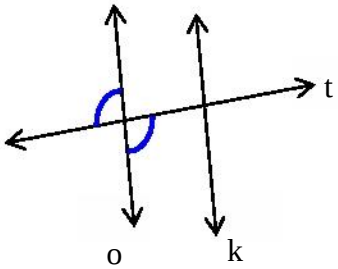
Example and practice 1: Which lines are parallel? State the reasons.



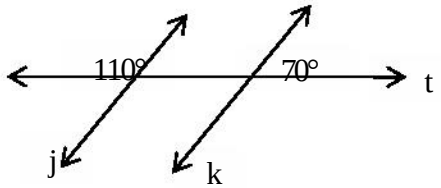
A)



B)

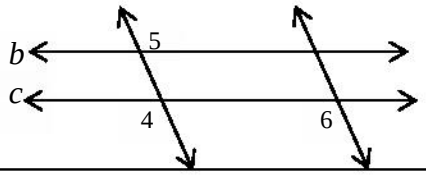


C)



D)

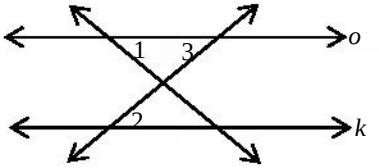
Example 2: Complete the proof below



Given: $\angle 5 \cong \angle 6$ and $\angle 6 \cong \angle 4$
Prove: $b \parallel c$

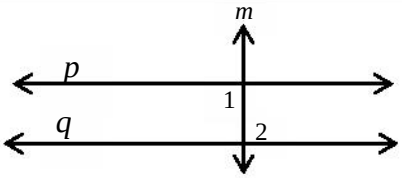
Statement	Reason
1.	1.
2.	2.
3.	3.

Practice 2: Complete the proofs below



A) Given: $\angle 1 \cong \angle 2$, $\angle 1 \cong \angle 3$
Prove: $o \parallel k$

Statement	Reason
1.	1.
2.	2.
3.	3.



B) Given: $m \perp p$ and $m \perp q$
Prove: $p \parallel q$

Statement	Reason
1.	1.
2.	2.
3.	3.
4.	4.

C) **GIVEN:** $g \parallel h$, $\angle 1 \cong \angle 2$
PROVE: $p \parallel r$

Statements	Reasons
1. $g \parallel h$, $\angle 1 \cong \angle 2$	1.
2. $\angle 1 \cong \angle 3$	2.
3. $\angle 2 \cong \angle 3$	3.
4. $p \parallel r$	4.