

Name _____

Date _____

Period 5

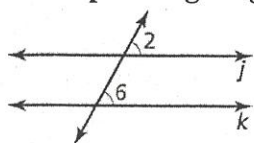
Parallel Line Theorem Converses

Lesson Objective

INBAT prove and use theorems
to show lines are //

Corresponding Angles Postulate: If two parallel lines are cut by a transversal, then the pairs of corresponding angles are congruent.

Corresponding Angles Converse:

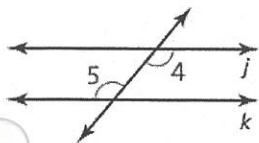


If: If two lines are cut by a transversal so that the Corresp. angles are $\cong$

Then: the lines are //.

Alternate Interior Angles Theorem: If two lines are cut by a transversal, then the pairs of alternate interior angles are congruent.

Alternate Interior Angles Converse:



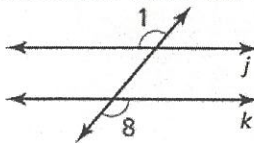
If: If two lines are cut by a transversal so that the alt. int. angles are $\cong$

Then: the lines are //.

PROOF: See pg. 140, Example #2!

Alternate Exterior Angles Theorem: If two lines are cut by a transversal, then the pairs of alternate exterior angles are congruent.

Alternate Exterior Angles Converse:



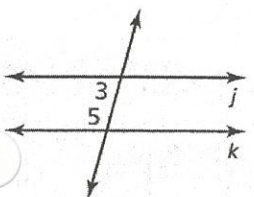
If: If two lines are cut by a transversal so that the alt. ext. angles are $\cong$

Then: the lines are //.

PROOF: See HW #3-4, #11!

Consecutive Interior Angles Theorem: If two lines are cut by a transversal, then the pairs of consecutive interior angles are supplementary.

Consecutive Interior Angles Converse:



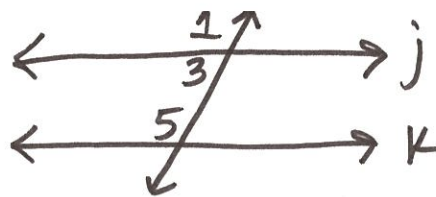
If: If two lines are cut by a transversal so that the consec. int. angles are supp

Then: the lines are //.

PROOF: on the back side...

Given: $\angle 3, \angle 5$ are supp

Prove: $j \parallel k$



Statements

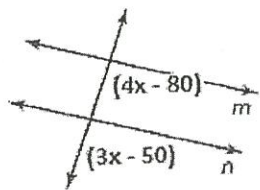
Reasons

- ① $\angle 3, \angle 5$ are supp
- ② $\angle 1, \angle 3$ are supp
- ③ $\angle 1 \cong \angle 5$
- ④ $j \parallel k$

- ① given
- ② linear pair post.
- ③ $\cong$ supps thm
- ④ corresp. $\angle s \cong \rightarrow \parallel$

Examples:

1. Find the value of x that makes $m \parallel n$

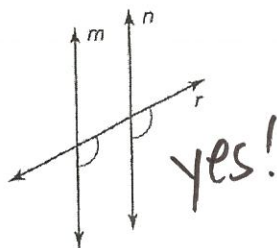


$$4x - 80 = 3x - 50$$

$$x = 30$$

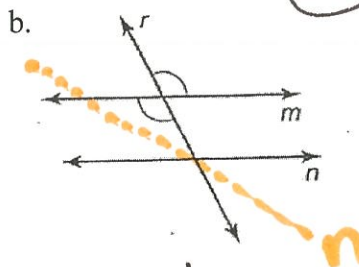
2. Determine whether there is enough information to prove that $m \parallel n$. If so, state the theorem that would be used.

a.



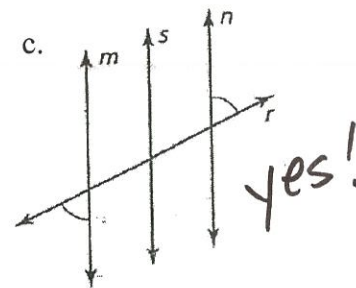
yes!
corresp. $\angle s \cong \rightarrow \parallel$

b.



No!

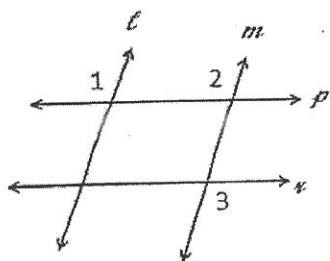
c.



yes!
alt. ext. $\angle s \cong \rightarrow \parallel$

3. Given: $p \parallel r$ and $\angle 1 \cong \angle 3$

Prove: $l \parallel m$



Statements

Reasons

- ① $p \parallel r, \angle 1 \cong \angle 3$
- ② $\angle 2 \cong \angle 3$
- ③ $\angle 1 \cong \angle 2$
- ④ $l \parallel m$

- ① given
- ② $\parallel \rightarrow$ alt. ext. $\angle s \cong$
- ③ Trans. prop. $\cong$
- ④ corresp. $\angle s \cong \rightarrow \parallel$