

## Questions on lesson 2.4?

Look over Lesson 2.4's homework,  
we will be taking our content  
mastery quiz soon!

## 2.5

# A Reversed Condition

## Parallel Line Converse Theorems

PG. 185-6 IN YOUR BOOK  $p \rightarrow q$

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.

The Corresponding Angle Postulate states: "If two parallel lines are intersected by a transversal, then the corresponding angles are congruent."

The Corresponding Angle Converse Postulate states: "If two lines intersected by a transversal form congruent corresponding angles, then the lines are parallel."

The Corresponding Angle Converse Postulate is used to prove new conjectures formed by writing the converses of the parallel lines theorems.

1. For each theorem:

- Identify the hypothesis  $p$  and conclusion  $q$ .
- Write the converse of the theorem as a conjecture.

a. Alternate Interior Angle Theorem: If two parallel lines are intersected by a transversal, then the alternate interior angles are congruent.

Hypothesis  $p$ :

two parallel lines are intersected by a transversal

Conclusion  $q$ :

the alternate interior angles are  $\cong$

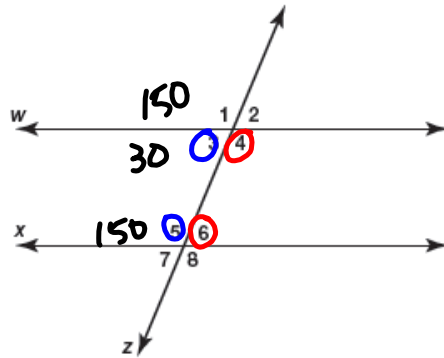
Alternate Interior Angle Converse Conjecture:

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

SKIP #2 on pg. 187

PG. 190 IN YOUR BOOK

3. The Same-Side Interior Angle Converse Conjecture states: "If two lines intersected by a transversal form supplementary same-side interior angles, then the lines are parallel."



a. Use the diagram to write the given and prove statements for the Same-Side Interior Angle Converse Conjecture.

Given:  $\angle 3$  &  $\angle 5$  are supplementary OR  $\angle 4$  &  $\angle 6$  are supplementary  
 Prove:  $w \parallel x$

b. Prove the Same-Side Interior Angle Converse Conjecture.

Statements	Reasons
1. $\angle 3$ & $\angle 5$ are supplementary	1. Given
2. $\angle 1$ & $\angle 3$ are a linear pair	2. Definition of a linear pair
3. $\angle 1$ & $\angle 3$ are supplementary	3. Linear Pair Postulate
4. $\angle 1 \cong \angle 5$	4. Supplementary to the same angle & are $\cong$
5. $w \parallel x$	5. Corresponding Angle Converse Postulate

PG. 192 IN YOUR BOOK - THIS IS HELPFUL  
\*I ALSO RECOMMEND COMPLETING "TALK THE TALK ON  
PGS. 192-3 FOR HOMEWORK

**Corresponding Angle Converse Postulate:** If two lines intersected by a transversal form congruent corresponding angles, then the lines are parallel.

**Alternate Interior Angle Converse Theorem:** If two lines intersected by a transversal form congruent alternate interior angles, then the lines are parallel.

**Alternate Exterior Angle Converse Theorem:** If two lines intersected by a transversal form congruent alternate exterior angles, then the lines are parallel.

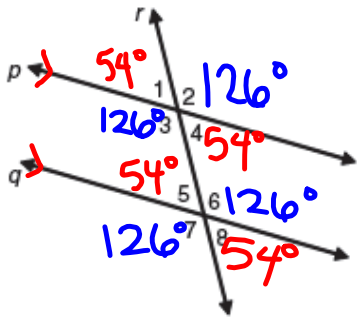
**Same-Side Interior Angle Converse Theorem:** If two lines intersected by a transversal form supplementary same-side interior angles, then the lines are parallel.

**Same-Side Exterior Angle Converse Theorem:** If two lines intersected by a transversal form supplementary same-side exterior angles, then the lines are parallel.

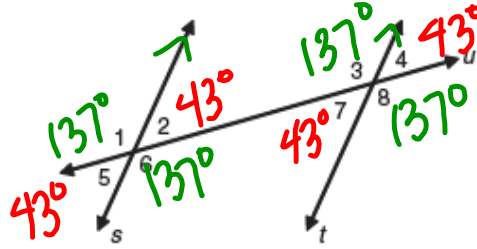
FROM LESSON 2.4 - NOT IN YOUR BOOK

1. Use the given information to determine the measures of each of the numbered angles.

a.  $p \parallel q$  and  $m\angle 1 = 54^\circ$



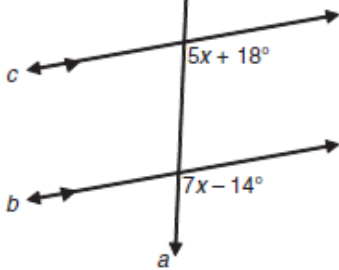
b.  $s \parallel t$  and  $m\angle 1 = 137^\circ$



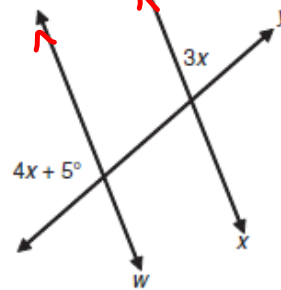
3. Solve for  $x$  in each figure.

a. Corresponding  $\angle$ s  $\cong$

$$5x + 18 = 7x - 14$$



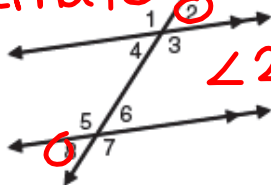
b. Same Side Exterior  $\angle$ s  
 $4x + 5 + 3x = 180$



5. Determine the relationship between the indicated angles and write a postulate or theorem that justifies your answer.

a. Angles 2 and 8

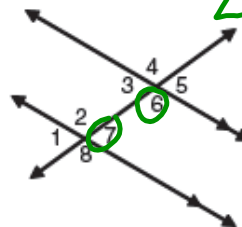
Alternate Exterior  $\angle$ s



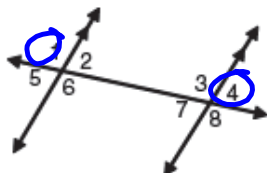
$$\angle 2 \cong \angle 8$$

b. Angles 6 and 7

Same Side Interior  $\angle$ s  
 $\angle 6$  &  $\angle 7$  are supplementary



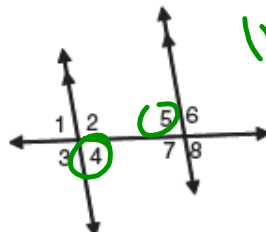
c. Angles 1 and 4



Same Side Exterior  $\angle$ s  
 $\angle 1$  &  $\angle 4$  are supplementary

d. Angles 4 and 5

Alternate Interior  $\angle$ s  
 $\angle 4 \cong \angle 5$



## FROM LESSON 2.5 - NOT IN YOUR BOOK

1. Use the figure to write the postulate or theorem that justifies each statement.

a.  $m\angle 1 = m\angle 8$ , so  $a \parallel b$

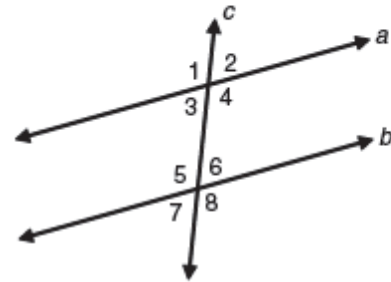
b.  $m\angle 4 + m\angle 6 = 180^\circ$ , so  $a \parallel b$

c.  $a \parallel b$ , so  $m\angle 3 = m\angle 7$

d.  $m\angle 2 + m\angle 8 = 180^\circ$ , so  $a \parallel b$

e.  $m\angle 4 = m\angle 5$ , so  $a \parallel b$

f.  $a \parallel b$ , so  $m\angle 3 + m\angle 5 = 180^\circ$



2. Use the given information to determine the pair of lines that are parallel. Write the postulate or theorem that justifies your answer.

a.  $m\angle 4 = m\angle 5$

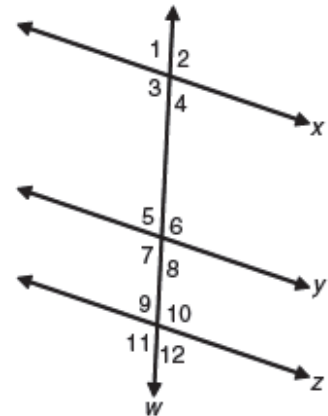
b.  $m\angle 2 + m\angle 12 = 180^\circ$

c.  $m\angle 7 = m\angle 11$

d.  $m\angle 8 + m\angle 10 = 180^\circ$

e.  $m\angle 1 + m\angle 7 = 180^\circ$

f.  $m\angle 2 = m\angle 11$



# Homework

## Finish 2.5