

Given:  $a \parallel b$  and  $c$

State the relationship between each pair of angles and explain why.

1. 9 & 2

9 & 2 are  
Supplementary

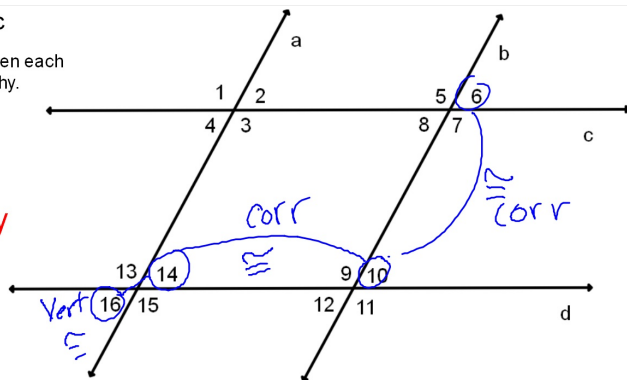
2. 13 & 7

$\angle 13 \cong \angle 9$   
 $\angle 9 \cong \angle 7$   
 $\angle 13 \cong \angle 7$

Corr  $\angle$ 's  
alt-int  $\angle$ 's  
Subst.

3. 6 & 16

6 & 16 are Congruent



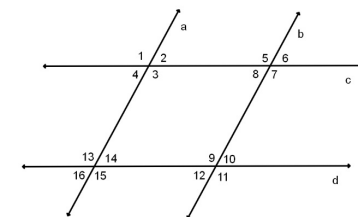
Write a proof.

Given:  $a \parallel b$  and  $c \parallel d$

Prove:  $\angle 6 \cong \angle 16$

Start by planning it out.

Statement	Reason
	1.

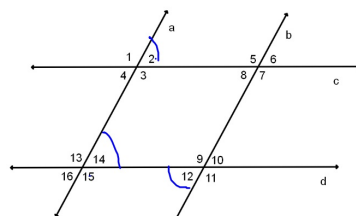


1. Write a proof.

Given:  $a \parallel b$  and  $c \parallel d$

Prove:  $\angle 2 \cong \angle 12$

Start by planning it out.

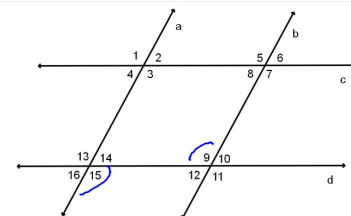


Statement	Reason
1. $a \parallel b$ & $c \parallel d$	1. Given
$\angle 2$ suppl $\angle 15$	Same-Side Ex.
$\angle 15$ suppl $\angle 12$	" " Int
$\angle 2 \cong \angle 12$	$\cong$ Supplements

2. Write a proof.

Given:  $a \parallel b$  and  $c \parallel d$

Prove:  $\angle 8$  and  $\angle 15$  are supplementary.



Statement	Reason
1. $a \parallel b$ & $c \parallel d$	1. Given
$\angle 8 \cong \angle 9$ suppl	2. SSI
$\angle 9 \cong \angle 15$	3. Alt Int $\angle$ 's
$\angle 8$ & $\angle 15$ suppl	4. Subst.

If two lines are parallel, then corresponding angles are Congruent

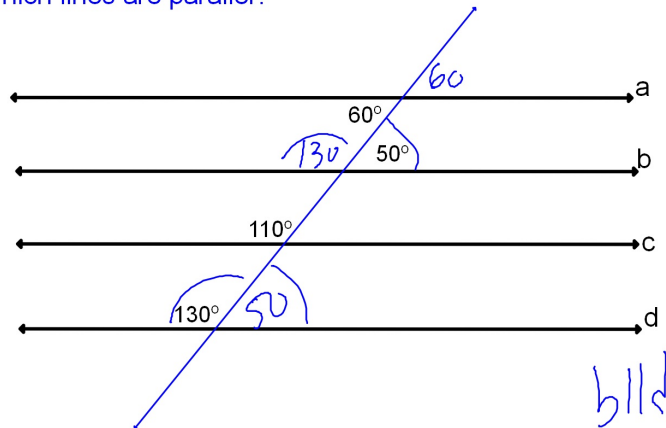
Write the converse:

If corresponding angles are congruent, then the lines are parallel.

Is this true?

Yes

Which lines are parallel?



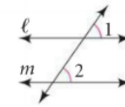
### Section 3-2: Proving Lines are Parallel.

#### Postulate 3-2

#### Converse of the Corresponding Angles Postulate

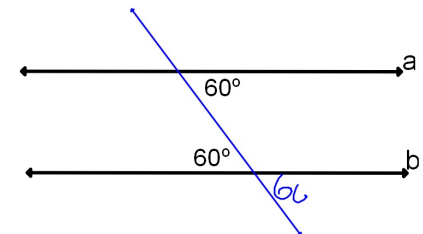
If two lines and a transversal form corresponding angles that are congruent, then the two lines are parallel.

$$\ell \parallel m$$



Are lines a and b parallel?

Yes

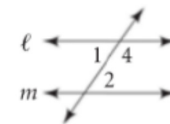


#### Theorem 3-5

#### Converse of the Alternate Interior Angles Theorem

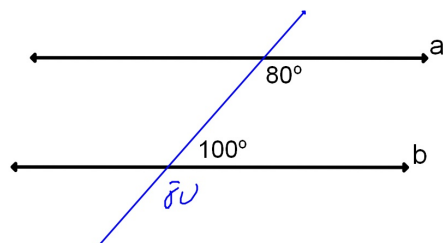
If two lines and a transversal form alternate interior angles that are congruent, then the two lines are parallel.

$$\text{If } \angle 1 \cong \angle 2, \text{ then } \ell \parallel m.$$



Are lines a and b parallel?

Yes



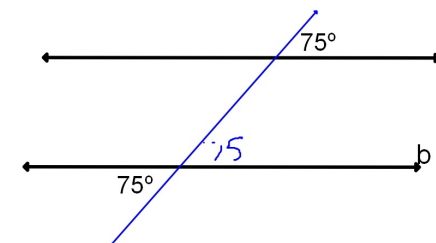
**Theorem 3-6 Converse of the Same-Side Interior Angles Theorem**

If two lines and a transversal form same-side interior angles that are supplementary, then the two lines are parallel.

If  $\angle 2$  and  $\angle 4$  are supplementary, then  $\ell \parallel m$ .

Are lines a and b parallel?

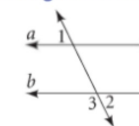
Yes



**Theorem 3-7 Converse of the Alternate Exterior Angles Theorem**

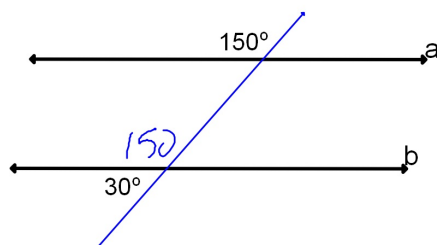
If two lines and a transversal form alternate exterior angles that are congruent, then the two lines are parallel.

If  $\angle 1 \cong \angle 2$ , then  $a \parallel b$ .



Are lines a and b parallel?

Yes

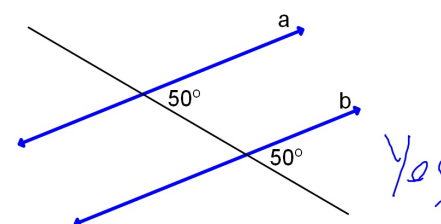


**Theorem 3-8 Converse of the Same-Side Exterior Angles Theorem**

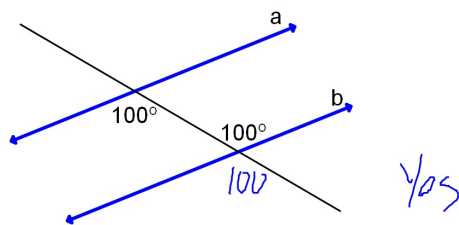
If two lines and a transversal form same-side exterior angles that are supplementary, then the two lines are parallel.

If  $\angle 1$  and  $\angle 3$  are supplementary, then  $a \parallel b$ .

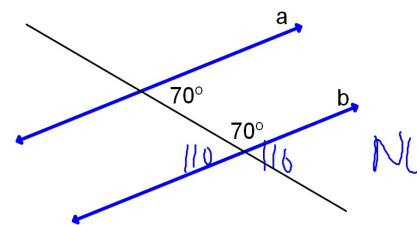
Are lines a and b parallel?



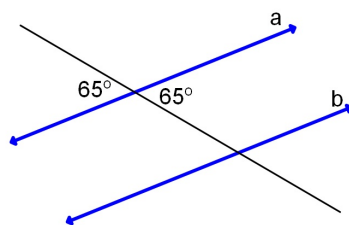
Are lines a and b parallel?



Are lines a and b parallel?



Are lines a and b parallel?



Can't be determined.