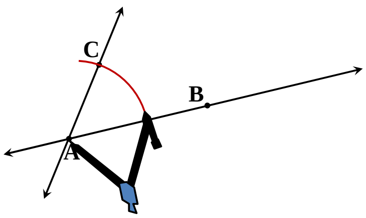
Lesson 3-3

Objective – To prove lines parallel.

Converse of Corresponding Angles Postulate

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

Parallel Line Construction



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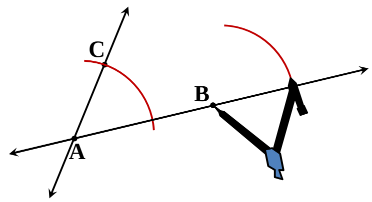

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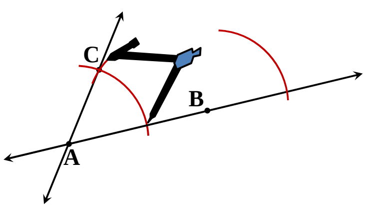

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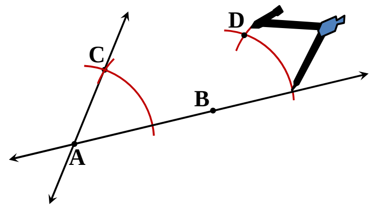

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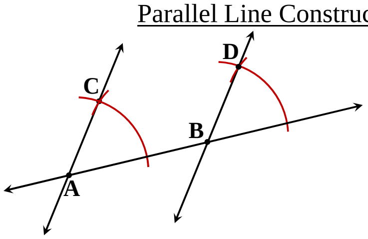


$\overleftrightarrow{AC} \parallel \overleftrightarrow{BD}$

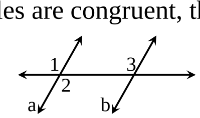
- Construct congruent angles

Converse of the Alternate Interior Angles Theorem

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

Given: $\angle 2 \cong \angle 3$

Prove: a || b



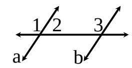
Statement	Reasons
1) $\angle 2 \cong \angle 3$	Given
2) $\angle 1 \cong \angle 2$	Vertical Angles Thm.
3) $\angle 1 \cong \angle 3$	Transitive Prop of Cong.
4) a || b	Conv. of Corres. $\angle$s Post.

Lesson 3-3

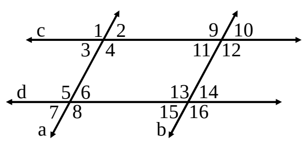
Converse of Alt. Int. Angles Theorem -	If two lines are cut by a transversal and the alt. int. angles are congruent then the lines are parallel.
Converse of Alt. Ext. Angles Theorem -	If two lines are cut by a transversal and the alt. ext. angles are congruent then the lines are parallel.
Converse of SS. Int. Angles Theorem -	If two lines are cut by a transversal and the SS. int. angles are suppl. then the lines are parallel.

Converse of the Same Side Interior Angles Theorem

Prove: If $\angle 2$ & $\angle 3$ are suppl., then a || b.



Statement	Reasons
1) $\angle 2$ & $\angle 3$ are suppl.	Given
2) $\angle 1$ & $\angle 2$ are linear pair.	Def. of linear pair
3) $\angle 1$ & $\angle 2$ are suppl.	Linear Pair Theorem
4) $\angle 1 \cong \angle 3$	$\cong$ Suppl. Thm.
5) a || b	Conv. of Corres. $\angle$s Post.



Which lines are proved parallel by the following, why?

1) $\angle 11 \cong \angle 15$
c || d , Conv. Corres. $\angle$s Post.

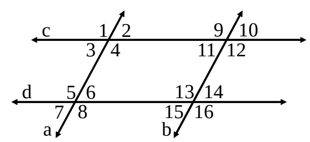
2) $\angle 5 \cong \angle 16$
a || b, Conv. Alt. Ext. $\angle$s Thm.

3) $\angle 4 \cong \angle 9$
a || b , Conv. Alt. Int. $\angle$s Thm.

4) $\angle 12 \cong \angle 16$
c || d , Conv. Corres. $\angle$s Post.

5) $\angle 5 \cong \angle 13$
a || b , Conv. Corres. $\angle$s Post.

6) $\angle 6$ suppl. to $\angle 13$
a || b , Conv. SS. Int. $\angle$s Thm.



Which lines are proved parallel by the following, why?

7) $\angle 7 \cong \angle 3$
c || d , Conv. Corres. $\angle$s Post.

8) $\angle 11 \cong \angle 14$
c || d , Conv. Alt. Int. $\angle$s Thm.

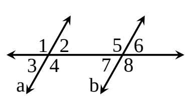
9) $\angle 4 \cong \angle 13$
No conclusion

10) $\angle 8 \cong \angle 16$
a || b , Conv. Corres. $\angle$s Post.

11) $\angle 10 \cong \angle 15$
c || d , Conv. Alt. Ext. $\angle$s Thm.

12) $\angle 13 \cong \angle 16$
No conclusion

Prove a || b given the following information.



1) $m\angle 2 \cong m\angle 7$

$\angle 2 \cong \angle 7$, Def. $\cong$ $\angle$s

a || b , Conv. Alt. Int. $\angle$s Thm.

2) $m\angle 1 = 3x + 10$, $m\angle 8 = 5x - 40$, $x = 25$

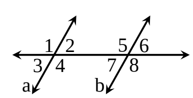
$m\angle 1 = 3(25) + 10 = 85$
$m\angle 8 = 5(25) - 40 = 85$, Substitution

$m\angle 1 = m\angle 8$, Substitution

$\angle 1 \cong \angle 8$, Def. $\cong$ $\angle$s

a || b, Conv. Alt. Ext. $\angle$s Thm.

Prove a || b given the following information.



3) $m\angle 1 + m\angle 7 = 180°$

$\angle 1 \cong \angle 4$, Vert. $\angle$s Thm.

$m\angle 1 \cong m\angle 4$, Def. $\cong$ $\angle$s

$m\angle 4 + m\angle 7 = 180°$, Substitution

$m\angle 4$ & $m\angle 7$ are suppl. , Def. Suppl. $\angle$s

a || b , Conv. SS. Int. $\angle$s Thm.