

Use the diagram above to complete the statements and then provide a reason.

1. If  $m\angle 1 = 150^\circ$ , then  $m\angle 2 =$  30  $^\circ$ . Reason:  $\angle$  Add. Post.

2.  $\angle 6 \cong \angle$  8 Reason: Vertical  $\angle$ s Thm

3.  $\angle 6$  is supplementary to  $\angle 7$ . Reason:  $\angle$  Add. Post.

4. If  $\angle 3 \cong \angle 4$  and  $\angle 4 \cong \angle 7$ , then  $\angle$  3  $\cong \angle$  7.

Reason: Trans. Prop. of  $\cong$

5. If  $\angle 4$  is complementary to  $\angle 3$  and  $\angle 4$  is complementary to  $\angle 2$ ,

then  $\angle 2 \cong \angle 3$

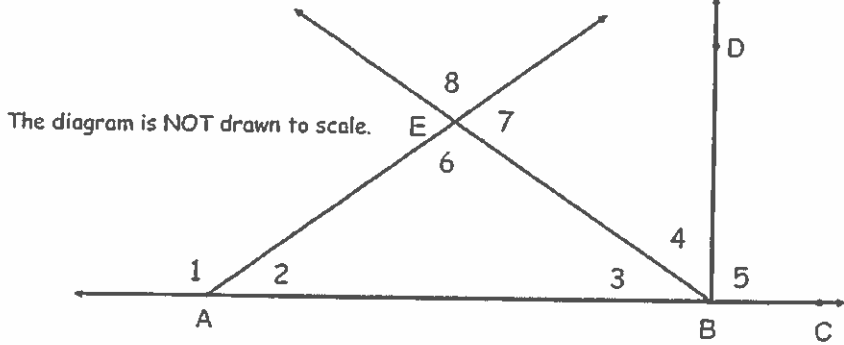
Reason:  $\cong$  Complements Thm

6. If  $\angle 1$  is supplementary to  $\angle 6$ , then  $\angle 1$  is supplementary to  $\angle$  8.

Reason:  $\cong$  Supplements Converse

7. If  $\overline{BD} \perp \overline{AC}$ , then  $\angle 3$  is complementary to  $\angle$  4.

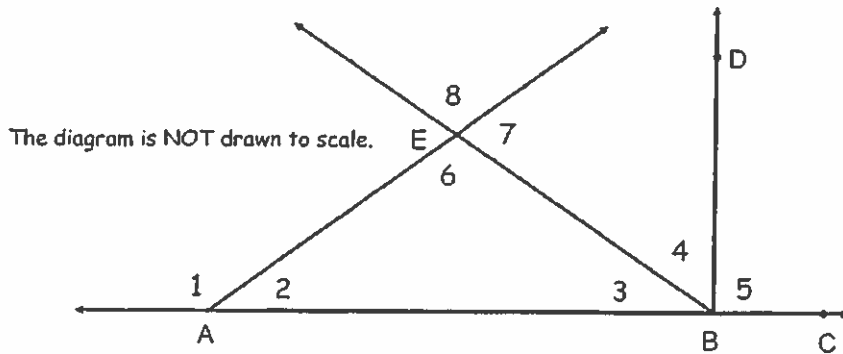
Reason: If the ext. sides of 2 adj.  $\angle$ s are  $\perp$ , then the  $\angle$ s are comp.



Write a 2-column proof for the following.  
 You may use more or less lines than the ones provided.

Given:  $m\angle 1 = m\angle 4 + m\angle 5$   
 Prove:  $\angle 2 \cong \angle 3$

Statements	Reasons
1. $m\angle 1 = m\angle 4 + m\angle 5$	Given
2. $m\angle 1 + m\angle 2 = 180^\circ$	$\angle$ Add. Post.
3. $m\angle 3 + m\angle 4 + m\angle 5 = 180^\circ$	$\angle$ Add. Post.
4. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 4 + m\angle 5$	Trans. Prop. of =
5. $m\angle 2 = m\angle 3$	Subtr. Prop. of = (4-1)
6. $\angle 2 \cong \angle 3$	Def. of $\cong \angle$ s
7. _____	_____
8. _____	_____



Write a 2-column proof for the following.  
You may use more or less lines than the ones provided.

Given:  $\angle 6 \cong \angle 7$  and  $\angle 5 \cong \angle 8$

Prove:  $\overline{BD} \perp \overline{AC}$

Statements	Reasons
1. $\angle 6 \cong \angle 7, \angle 5 \cong \angle 8$	Given
2. $\overline{BE} \perp \overline{AE}$	If 2 lines form $\cong$ adj. $\angle$ s, then the lines are $\perp$ .
3. $\angle 8$ is a rt $\angle$	Def. of $\perp$
4. $\angle 5$ is a rt $\angle$	Right $\angle$ s Converse Thm
5. $\overline{BD} \perp \overline{AC}$	Def. of $\perp$
6. _____	_____
7. _____	_____
8. _____	_____

Write 2-column proofs for the following theorems. You may use more or less lines than the ones provided.

**Right Angles Converse Theorem** If two angles are congruent and one of them is a right angle, then the other one is a right angle.

Given:  $\angle 1 \cong \angle 2$ ,  $\angle 1$  is a rt.  $\angle$

Prove:  $\angle 2$  is a rt.  $\angle$

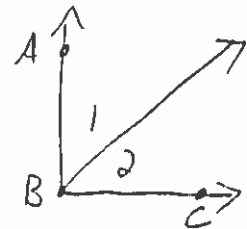
Statements	Reasons
1. $\angle 1 \cong \angle 2$ , $\angle 1$ is a rt. $\angle$	Given
2. $m\angle 1 = m\angle 2$	Def. of $\cong$ $\angle$ s
3. $m\angle 1 = 90^\circ$	Def. of rt. $\angle$
4. $m\angle 2 = 90^\circ$	Trans. Prop of =
5. $\angle 2$ is a rt. $\angle$	Def. of rt. $\angle$

**Theorem:** If two adjacent acute angles are complementary, then the exterior sides of the angles are perpendicular.

Given:  $\angle 1$  is comp. to  $\angle 2$

Prove:  $\vec{BA} \perp \vec{BC}$

Diagram



Statements	Reasons
1. $\angle 1$ is comp. to $\angle 2$	Given
2. $m\angle 1 + m\angle 2 = 90^\circ$	Def of comp. $\angle$ s
3. $m\angle 1 + m\angle 2 = m\angle ABC$	$\angle$ Add. Post.
4. $m\angle ABC = 90^\circ$	Trans. Prop of =
5. $\vec{BA} \perp \vec{BC}$	Def. of $\perp$ rays
6.	