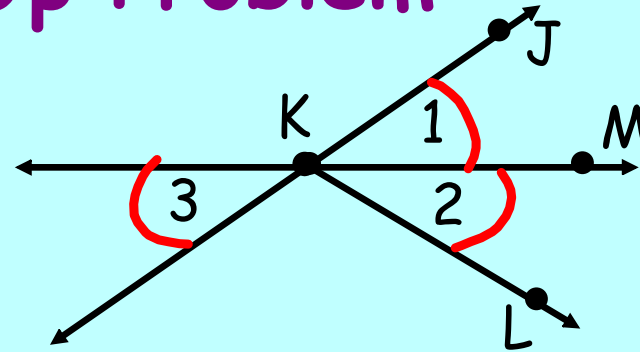


# 10/3/19 - Warm Up Problem

Given:  $\overrightarrow{KM}$  bisects  $\angle JKL$

Prove:  $\angle 2 \cong \angle 3$



Statements	Justifications
1. $\overrightarrow{KM}$ <u>bisects</u> $\angle JKL$	- Given
2. $\angle 1 \cong \angle 2$	def of bisect
3. $\angle 1 \cong \angle 3$	Vertical Theorem
4. $\angle 2 \cong \angle 3$	Transitive prop. $\cong$

## Section 2.6 - Proving Angles Congruent

**Goal:** prove and use theorems about congruent angles

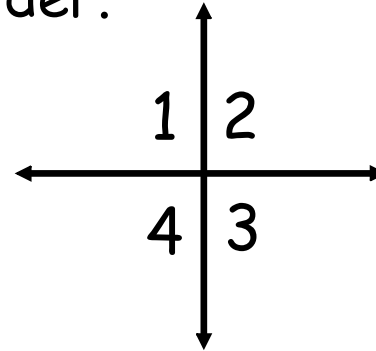
### STEPS FOR WRITING A TWO-COLUMN PROOF

1. **GIVENS** - Copy all given information.
2. **DEFINITIONS** - If your given information is not in equation form, make it an equation using a definition.
3. **POSTULATES / THEOREMS** - Add new equations into your proof using postulates and theorems.
4. **PROPERTIES** - Manipulate and combine your equations to arrive at the statement you are proving.  
- **TRANSITIVE PROPERTY AND SUBSTITUTION ARE USED TO COMBINE 2 EQUATIONS TOGETHER.**

Complete the proof by putting the statements and justifications in the correct order.

Given:  $\angle 1 \cong \angle 4$

Prove:  $\angle 2 \cong \angle 3$

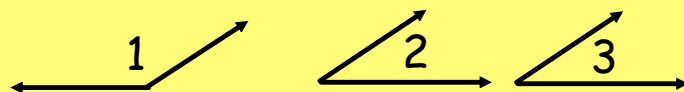


Statements	Justifications
1. $\angle 1 \cong \angle 4$	Given
2. $\angle 2 \cong \angle 4$	Vertical Angles Theorem
3. $\angle 1 \cong \angle 3$	Vertical Angles Theorem
4. $\angle 1 \cong \angle 2$	Transitive Property of $\cong$ ( , )
5. $\angle 2 \cong \angle 3$	Transitive Property of $\cong$ ( , )

## Theorems about Congruent Angles

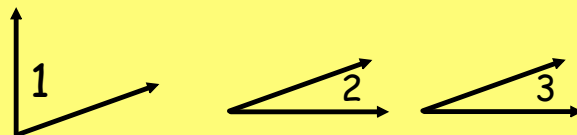
### Congruent Supplements Theorem

If two angles are supplements of the same angle (or of congruent angles), then **the two angles are congruent**.



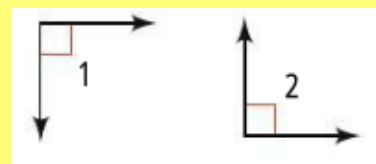
### Congruent Complements Theorem

If two angles are complements of the same angle (or of congruent angles), then **the two angles are congruent**.



### Congruent Right Angles Theorem

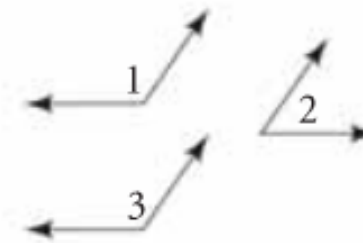
All right angles are congruent.



## Proving the Congruent Supplements Theorem

**Given:**  $\angle 1$  and  $\angle 2$  are supplementary.  
 $\angle 3$  and  $\angle 2$  are supplementary.

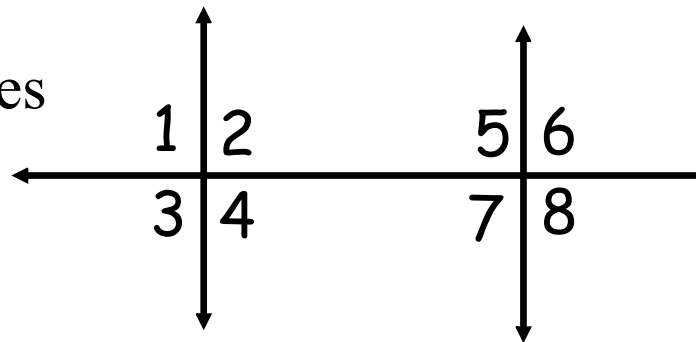
**Prove:**  $\angle 1 \cong \angle 3$



Statements	Justifications
1. $\angle 1$ and $\angle 2$ are <u>supplementary</u>	Given
2. $\angle 3$ and $\angle 2$ are <u>supplementary</u>	Given
3. $m\angle 1 + m\angle 2 = 180$	Def. of Supplementary
4. $m\angle 3 + m\angle 2 = 180$	Def. of Supplementary
5. $m\angle 1 + m\angle 2 = m\angle 3 + m\angle 2$	Transitive Prop. of = ( , )
6. $m\angle 1 = m\angle 3$	Subtraction Prop.
7. $\angle 1 \cong \angle 3$	Def. of Congruent

**Given:**  $\angle 1$  and  $\angle 8$  are right angles

**Prove:**  $\angle 4 \cong \angle 5$

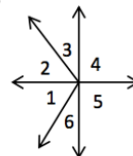


Statements	Justifications
1. $\angle 1$ and $\angle 8$ are right angles	Given
2. $\angle 1 \cong \angle 8$	Congruent Right Angles Theorem
3. $\angle 1 \cong \angle 4$	Vertical Angles Theorem
4. $\angle 5 \cong \angle 8$	Vertical Angles Theorem
5. $\angle 8 \cong \angle 4$	Transitive Property of $\cong$ ( , )
6. $\angle 4 \cong \angle 5$	Transitive Property of $\cong$ ( , )

## Concept 6 Worksheet #2 (6-10)

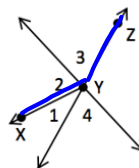
PROOFS USING ANGLE RELATIONSHIPS AND THEOREMS

6. **Given:**  $\angle 4$  is a right angle  
 $\angle 1 \cong \angle 2$   
**Prove:**  $\angle 2$  and  $\angle 6$  are complementary



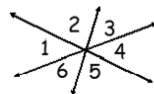
Statements	Justifications
1. $\angle 4$ is a right angle	
2. $\angle 1 \cong \angle 2$	
3. $m\angle 4 = 90$	
4. $m\angle 1 = m\angle 2$	
5. $m\angle 1 + m\angle 6 = m\angle 4$	
6. $m\angle 1 + m\angle 6 = 90$	
7. $m\angle 2 + m\angle 6 = 90$	
8. $\angle 2$ and $\angle 6$ are complementary	

7. **Given:**  $\angle 2$  is a right angle  
 $m\angle 4 = 60^\circ$   
**Prove:**  $m\angle XYZ = 150^\circ$



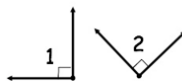
Statements	Justifications
1. $\angle 2$ is a right angle	
2. $m\angle 4 = 60$	
3. $m\angle 2 = 90$	
4. $m\angle 2 + m\angle 3 = m\angle XYZ$	Angle Add. Post.
5. $m\angle 3 = m\angle 4$	Vertical Angles Thm
6. $m\angle 2 + m\angle 4 = m\angle XYZ$	Substitution Prop.
7. $90 + 60 = m\angle XYZ$	
8. $150 = m\angle XYZ$	
9. $m\angle XYZ = 150$	

8. Given:  $\angle 1 \cong \angle 2$   
 Prove:  $\angle 5 \cong \angle 4$



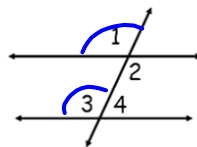
Statements	Justifications
1.	
2.	
3.	
4.	
5.	
6.	

9. Given:  $\angle 1$  is a right angle  
 $\angle 2$  is a right angle  
 Prove:  $\angle 1 \cong \angle 2$



Statements	Justifications
1.	
2.	
3.	
4.	
5.	
6.	

10. Given:  $\angle 1 \cong \angle 3$   
 Prove:  $\angle 2$  and  $\angle 4$  are supplementary



Statements	Justifications
1. $\angle 1 \cong \angle 3$	Given
2. $m\angle 1 = m\angle 3$	Def. of congruent
3. $m\angle 1 = m\angle 2$	Vertical Angles Thm
4. $m\angle 3 + m\angle 4 = 180$	Linear Pair Post.
5. $m\angle 3 = m\angle 2$	Transitive Prop. of =
6. $m\angle 2 + m\angle 4 = 180$	Substitution Prop.
7. $\angle 2$ and $\angle 4$ are supp.	Def. of Supp.