

# 4.6 Prove Angle Pair Relationships

pp. 240 - 242



# VOCABULARY

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## Adjacent angles

**Two angles that share a common vertex and side, but have no common interior points.**

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## Linear pair

**Two adjacent angles are a linear pair if their noncommon Sides are opposite rays.**



### **THEOREM 4.3 RIGHT ANGLES CONGRUENCE THEOREM**

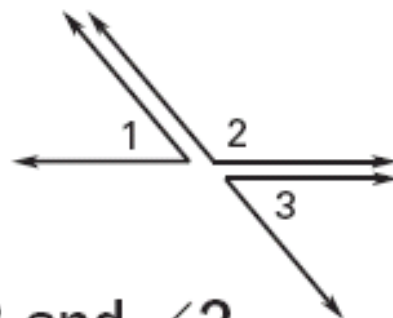
All right angles are \_\_\_\_\_.

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### **THEOREM 4.4 CONGRUENT SUPPLEMENTS THEOREM**

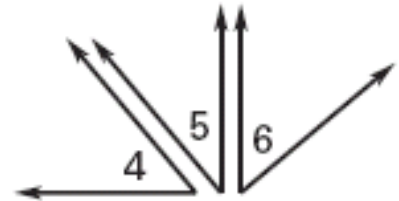
If two angles are supplementary to the same angle (or to congruent angles), then they are \_\_\_\_\_.

If  $\angle 1$  and  $\angle 2$  are supplementary and  $\angle 3$  and  $\angle 2$  are supplementary, then \_\_\_\_\_.



## THEOREM 4.5 CONGRUENT COMPLEMENTS THEOREM

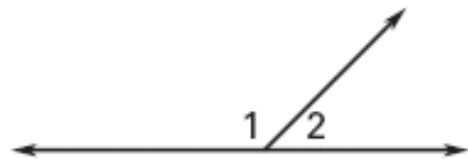
If two angles are complementary to the same angle (or to congruent angles), then they are \_\_\_\_\_.



If  $\angle 4$  and  $\angle 5$  are complementary and  $\angle 6$  and  $\angle 5$  are complementary, then \_\_\_\_\_.

### LINEAR PAIR POSTULATE

If two angles form a linear pair, then they are \_\_\_\_\_.

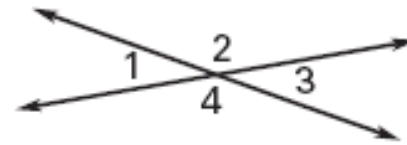


$\angle 1$  and  $\angle 2$  form a linear pair, so  $\angle 1$  and  $\angle 2$  are supplementary and  $m\angle 1 + m\angle 2 =$  \_\_\_\_\_.



## THEOREM 4.6 VERTICAL ANGLES CONGRUENCE THEOREM

Vertical angles are \_\_\_\_\_.

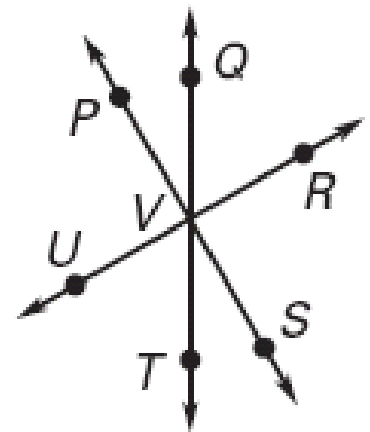


### Example 1 Find angle measures

Complete the statement given that  $m\angle RVS = 90^\circ$ .

a.  $m\angle PVU = \underline{\quad ? \quad}$

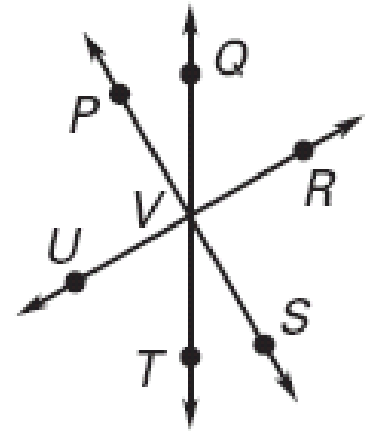
a. Because  $\angle RVS$  and  $\angle PVU$  are \_\_\_\_\_,  
 $\angle RVS \cong \angle PVU$ . By the definition of congruent angles,  
 $m\angle RVS = m\angle PVU$ . So,  $m\angle PVU = \underline{\quad}$ .



**Example 1****Find angle measures**

Complete the statement given that  $m\angle RVS = 90^\circ$ .

b. If  $m\angle QVU = 120^\circ$ ,  
then  $m\angle SVT = \underline{\hspace{2cm}}$ .



b. By the Angle Addition Postulate,  
 $m\angle QVU = \underline{\hspace{2cm}}$ . Substitute to get  
 $120^\circ = 90^\circ + m\angle PVQ$ . By the Subtraction Property of  
Equality,  $m\angle PVQ = \underline{\hspace{2cm}}$ . Because  $\angle SVT$  and  $\angle PVQ$   
are                      angles,  $\angle SVT \cong \angle PVQ$ . By the definition  
of                     ,  $m\angle SVT = m\angle PVQ$ . So,  
 $m\angle SVT = \underline{\hspace{2cm}}$ .



**Example 2** Find angle measures

If  $m\angle QRO = 90^\circ$  and  $m\angle PRO = 45^\circ$ , find  $m\angle 1$ ,  $m\angle 2$ , and  $m\angle 3$ .

**Solution**

$\angle QRP$  and  $\angle PRO$  are complementary.

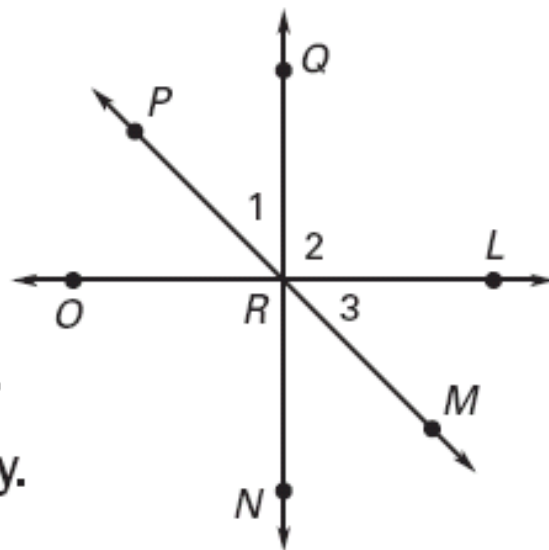
So,  $m\angle 1 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ .

$\angle QRL$  and  $\angle QRO$  are supplementary.

So,  $m\angle 2 = \underline{\hspace{2cm}} - \underline{\hspace{2cm}} = \underline{\hspace{2cm}}$ .

$\angle LRM$  and  $\angle PRO$  are vertical angles.

So,  $m\angle 3 = \underline{\hspace{2cm}}$ .



$$m\angle LRM = m\angle NRP = 90^\circ$$

1. Find  $m\angle QRO$ .

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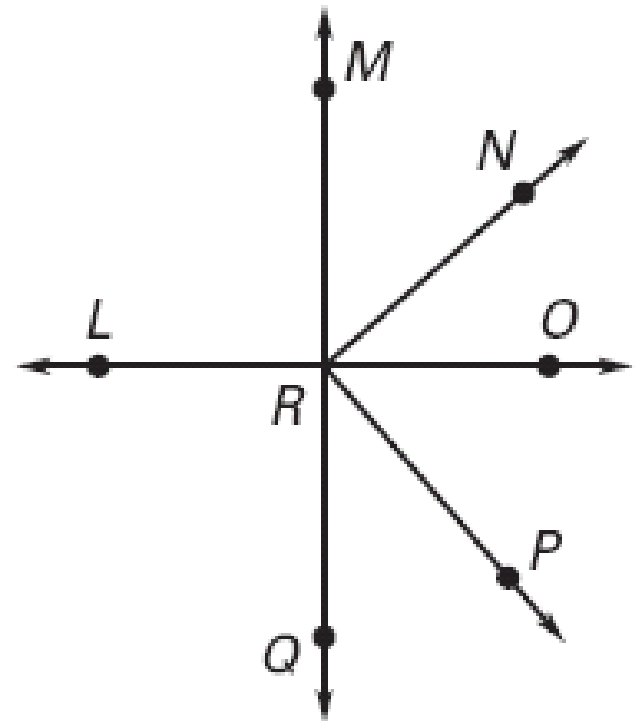
2. Find  $m\angle LRQ$ .

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3. If  $m\angle NRO = 41^\circ$ , find  $m\angle MRN$ .

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4. If  $m\angle PRO = 49^\circ$ , find  $m\angle NRO$ .



**Example 3***Use algebra*

Solve for  $x$  in the diagram.

**Solution**

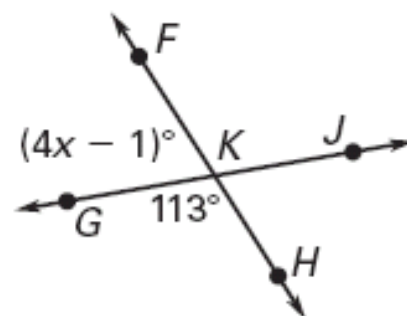
Because  $\angle FKG$  and  $\angle GKH$  form a linear pair, the sum of their measures is \_\_\_\_\_.

$$(4x - 1)^\circ + 113^\circ = \underline{\hspace{2cm}}$$

$$4x + \underline{\hspace{1cm}} = \underline{\hspace{2cm}}$$

$$4x = \underline{\hspace{2cm}}$$

$$x = \underline{\hspace{2cm}}$$



**Definition of supplementary angles**

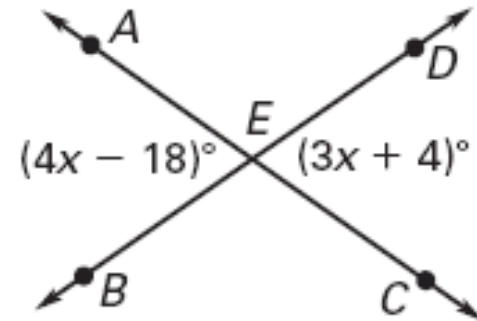
**Combine like terms.**

**Subtract \_\_\_\_\_ from each side.**

**Divide each side by 4.**



5. Solve for  $x$  in the diagram.



pp. 225 – 6    1 – 9 all, 10 – 16 even, 18 – 21 all  
4.5 B #2

