

### 1-5 Angle Relationships

How many angles are shown in the diagram?  
Name them all.

Be sure each name represents a unique angle!

As angles appear on a diagram, they have different relationships to one another based on where they are in relation to each other.

**Adjacent angles** are two angles that lie in the same plane, have a common vertex and a common side, but no common interior points.

Are  $\angle ARC$  and  $\angle RCQ$  adjacent angles?  
Are  $\angle RCQ$  and  $\angle ACQ$  adjacent angles?

**Vertical angles** are two **nonadjacent angles** formed by two intersecting lines.

$\angle AXZ$  and  $\angle QXH$  are vertical angles.  
 $\angle ZXH$  and \_\_\_\_\_ are vertical angles.

Every pair of 2 intersecting lines creates \_\_\_\_\_ pairs of vertical angles.

A **linear pair** is a pair of adjacent angles with noncommon sides that are opposite rays.

$\angle 1$  and  $\angle 2$  are a linear pair.  
(When they are side-by-side, they make a straight line.)

$\angle 4$  and  $\angle 5$  are NOT a linear pair.  
(When they are side-by-side, they do not make a straight line.)

**Definition:** Two angles with measures that have a sum of 90 are called **complementary angles**.

Find  $x$ .

The diagram shows that the two angles are complementary, because the box in the corner of the angle says that the "outside" angle measures 90.

$$x + 40 = 90$$

$$x = 50.$$

**Definition:** Two angles with measures that have a sum of 180 are called **supplementary angles**.

Given: the two angles shown are supplementary.  
Find the value of  $y$ .

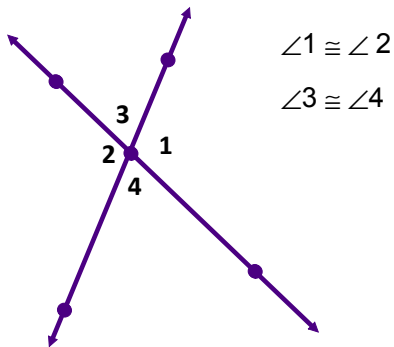
Since they are said to be supplementary, then the sum of the measures must be 180.

$$85 + y = 180$$

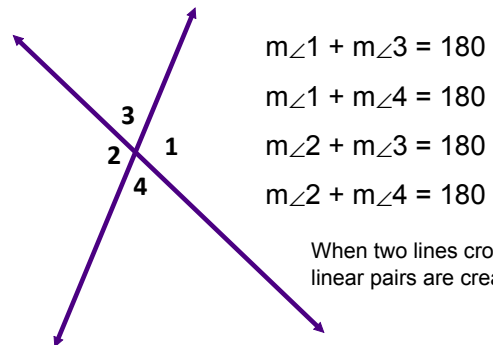
$$y = 180 - 85$$

$$y = 95$$

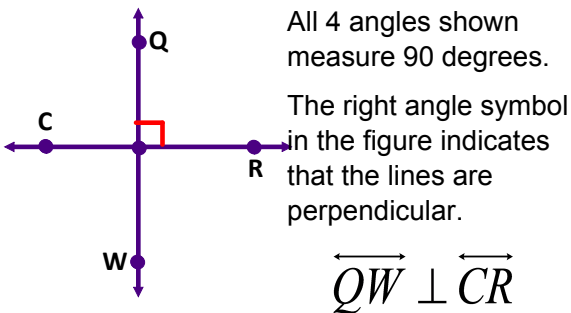
Key concept: Vertical angles are congruent.



Key concept: The angles that make up a linear pair are supplementary.



Key concept: Perpendicular lines intersect to form 4 right angles.



**IMPORTANT TO REMEMBER!!!!**

The only things we can "assume" from a diagram, if we are not told directly, are:

1. Points are coplanar/noncoplanar.
2. Points are collinear/noncollinear.
3. The location of the intersection of lines/segments/planes.
4. The "betweenness" of points.
5. The location of points relative to angles - on, interior, exterior.
6. Adjacent angles, linear pairs, vertical angles.