

# Lesson 7.1

## Adjacent and Vertical Angles

Feb 22-8:23 AM

### Essential Question

What can you conclude about the angles formed by two intersecting lines?

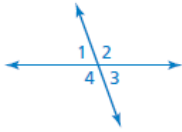
Essential Question

## Key Ideas

### Adjacent Angles

**Words** Two angles are **adjacent angles** when they share a common side and have the same vertex.

### Examples



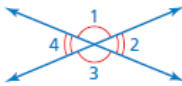
$\angle 1$  and  $\angle 2$  are adjacent.

$\angle 2$  and  $\angle 4$  are not adjacent.

### Vertical Angles

**Words** Two angles are **vertical angles** when they are opposite angles formed by the intersection of two lines. Vertical angles are **congruent angles**, meaning they have the same measure.

### Examples



$\angle 1$  and  $\angle 3$  are vertical angles.

$\angle 2$  and  $\angle 4$  are vertical angles.

## 7.1 Notes

Get out your spiral notebook and protractor too!

Key Idea

### Example 1:

Use the figure shown.

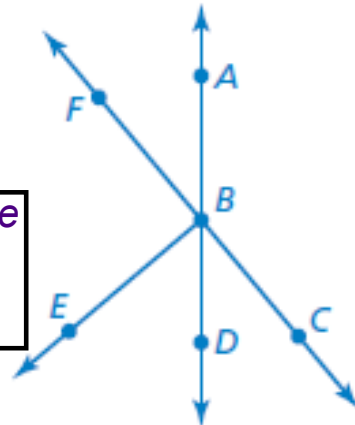
a. Name a pair of adjacent angles.

$\angle ABC$  &  $\angle CBD$

$\angle EBF$  &  $\angle FBA$

$\angle FBD$  &  $\angle DBC$

*Note: All pairs have two of the same points.*



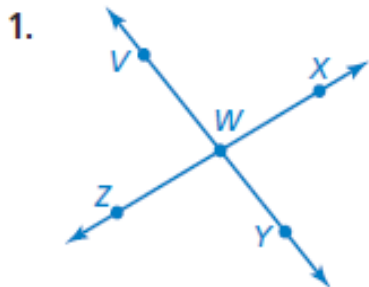
b. Name a pair of vertical angles.

$\angle ABF$  &  $\angle CBD$

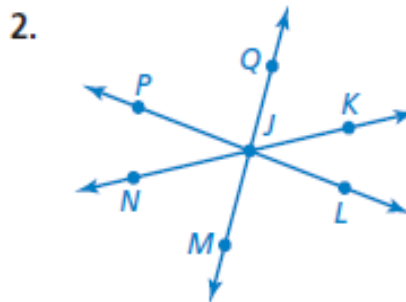
$\angle ABC$  &  $\angle CBA$  are the same angle

Example 1

Name two pairs of adjacent angles and two pairs of vertical angles in the figure.



Adjacent:  $\angle XWY$  &  $\angle YWZ$   
 $\angle ZWV$  &  $\angle VWX$   
 Vertical:  $\angle VWX$  &  $\angle YWZ$   
 $\angle ZWV$  &  $\angle XWY$

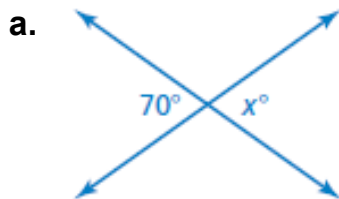


Adjacent:  $\angle PJQ$  &  $\angle QJK$   
 $\angle MJK$  &  $\angle KJP$   
 Vertical:  $\angle QJK$  &  $\angle MJN$   
 $\angle PJQ$  &  $\angle LJM$   
 $(\angle PJN$  &  $\angle KJL)$

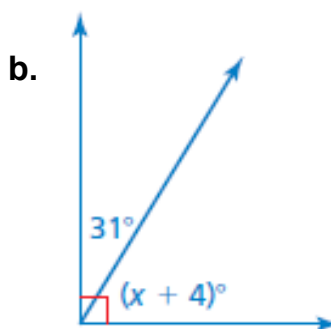
On your own 1-2

### Example 2:

Tell whether the angles are *adjacent* or *vertical*. Then find the value of  $x$ .



Vertical  
 $x^\circ = 70^\circ$



Adjacent  
 $31^\circ + x + 4^\circ = 90^\circ$   
 $35^\circ + x = 90^\circ$   
 $-35^\circ \quad -35^\circ$   

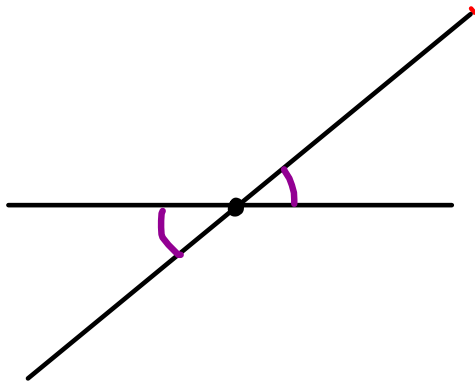

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 $x = 55^\circ$

Example 2

**Example 3:**

Draw a pair of vertical angles with a measure of  $40^\circ$ .



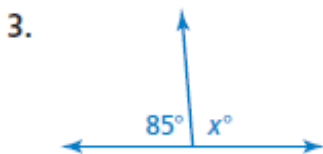
1) Draw a line and put a point on it (this is your vertex).

2) Place your protractor on the vertex and mark where  $40^\circ$  would be.

3) Use a straightedge to draw a line from the  $40^\circ$  mark through the vertex.

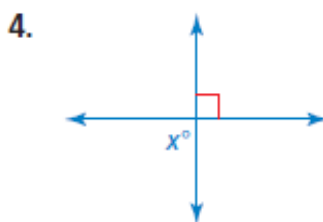
Example 3

Tell whether the angles are *adjacent* or *vertical*. Then find the value of  $x$ .



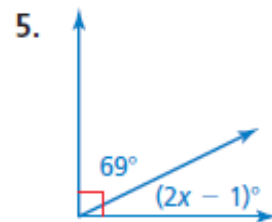
Adjacent

$$\begin{array}{r} 85^\circ + x = 180^\circ \\ -85^\circ \quad -85^\circ \\ \hline x = 95^\circ \end{array}$$



Vertical

$$x = 90^\circ$$



Adjacent

$$\begin{array}{r} 69^\circ + 2x - 1 = 90^\circ \\ 68^\circ + 2x = 90^\circ \\ -68^\circ \quad -68^\circ \\ \hline 2x = 22^\circ \\ \div 2 \quad \div 2 \\ \hline x = 11^\circ \end{array}$$

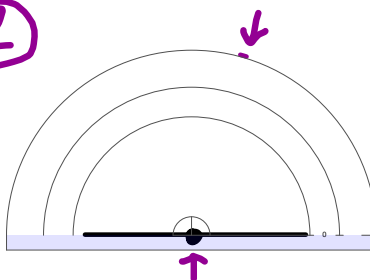
On your own 3-6

6. Draw a pair of vertical angles with a measure of  $75^\circ$ .

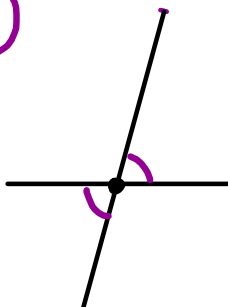
①



②



③



### True or False?

1. Vertical angles are always acute. F

2. Adjacent angles could be acute. T

3. Adjacent angles could be obtuse. T

4. Vertical angles are congruent. T

5. Adjacent angles could be congruent. T