

# What Are Your Angles?

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**Reporting Category** Measurement

**Topic** Working with angles

**Primary SOL** 8.6 The student will

- a) verify by measuring and describe the relationships among vertical angles, adjacent angles, supplementary angles, and complementary angles; and
- b) measure angles of less than  $360^\circ$ .

## Materials

- Protractors
- What Are Your Angles activity sheet (attached)

## Vocabulary

*acute angles, obtuse angles, right angles, vertex, rays, angles, degrees, protractor, straight angles* (earlier grades)

*supplementary angles, complementary angles, vertical angles, adjacent angles, reflex angles* (8.6)

## Student/Teacher Actions (what students and teachers should be doing to facilitate learning)

1. Review how to measure angles with a protractor. As students measure angles, have them practice naming them, describing them as acute, right, obtuse, straight, or reflex.
2. Distribute copies of the What Are Your Angles activity sheet. Group students in pairs, and have partners work together to complete the activity. As students work, circulate around the room to ask questions of the partners and answer their questions. (Note: Student definitions of the angle pairs may not be as descriptive as yours, but as long as their definitions are mathematically correct and they can justify them, you may choose to acknowledge them as correct and acceptable.)

## Assessment

- **Questions**
  - How are complementary and supplementary angles similar? How are they different?
  - If angle 1 and angle 2 are supplementary, what is the measure of angle 2 ( $m\angle 2$ ) when the measure of angle 1 =  $m\angle 2 + 72^\circ$ ? Defend your answer.
- **Journal/Writing Prompts**
  - Angles 1 and 2 are supplementary. State whether they can also be vertical, and explain why or why not.

**Extensions and Connections (for all students)**

- Have student pairs draw examples of vertical angles, adjacent angles, supplementary angles, and complementary angles. Then, have them switch drawings with other student pairs and measure the angles and describe the relationships.
- Have each student create a drawing of a house showing all the types of angles and angle pairs being studied.
- Have students use an interactive geometry computer program to draw and measure angles.
- Have students measure angles around the school building and find examples of vertical angles, adjacent angles, supplementary angles, and complementary angles.

**Strategies for Differentiation**

- Direct students to make an angle vocabulary glossary in which they include a drawing to represent the definition of each angle and angle pair.
- Have students stand and model with their arms each type of angle. Have them work with partners to model the angle pairs (vertical angles, adjacent angles, supplementary angles, and complementary angles).
- Have students color code angle pairs by coloring the rays different colors to indicate vertical angles, adjacent angles, supplementary angles, and complementary angles.

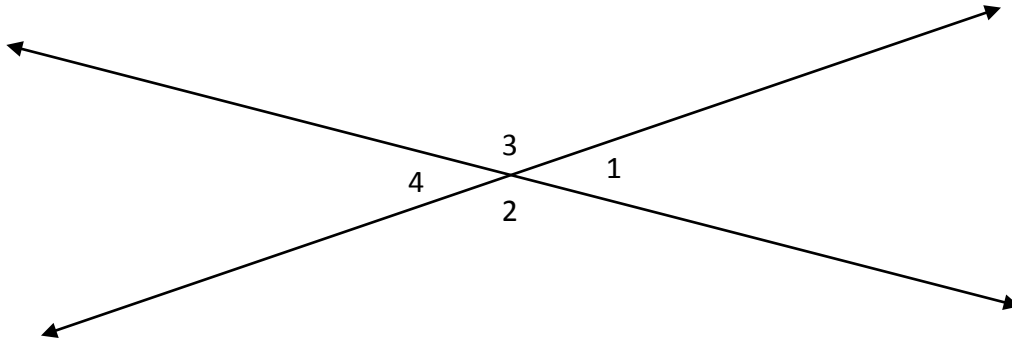
# What Are Your Angles?

Name \_\_\_\_\_ Date \_\_\_\_\_

## Vertical Angles

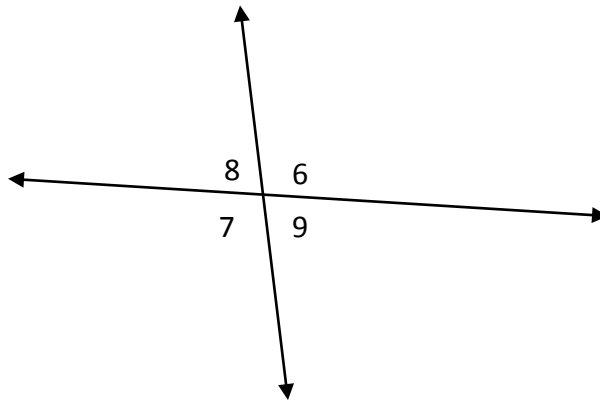
$\angle 1$  and  $\angle 4$  are vertical angles. Measure and record each angle.  $m\angle 1 = \underline{\hspace{1cm}}^\circ$   $m\angle 4 = \underline{\hspace{1cm}}^\circ$

$\angle 2$  and  $\angle 3$  are vertical angles. Measure and record each angle.  $m\angle 2 = \underline{\hspace{1cm}}^\circ$   $m\angle 3 = \underline{\hspace{1cm}}^\circ$



$\angle 6$  and  $\angle 7$  are vertical angles. Measure and record each angle.  $m\angle 6 = \underline{\hspace{1cm}}^\circ$   $m\angle 7 = \underline{\hspace{1cm}}^\circ$

$\angle 8$  and  $\angle 9$  are vertical angles. Measure and record each angle.  $m\angle 8 = \underline{\hspace{1cm}}^\circ$   $m\angle 9 = \underline{\hspace{1cm}}^\circ$



What is the relationship between the measures of vertical angles?

Draw a pair of vertical angles.

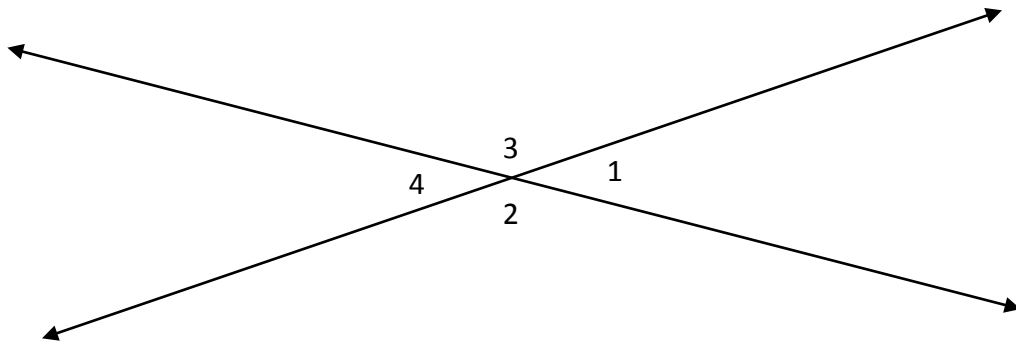
Write a definition of vertical angles.

Use your figure to test your definition. Does your definition hold true? Why, or why not? Write a new definition, if necessary.

### Supplementary Angles

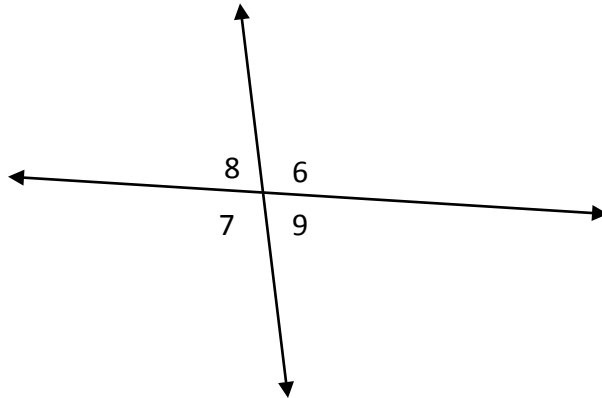
$\angle 1$  and  $\angle 3$  are supplementary angles. Measure and record each angle.  $m\angle 1 = \underline{\hspace{1cm}}^\circ$   $m\angle 3 = \underline{\hspace{1cm}}^\circ$

$\angle 2$  and  $\angle 4$  are supplementary angles. Measure and record each angle.  $m\angle 2 = \underline{\hspace{1cm}}^\circ$   $m\angle 4 = \underline{\hspace{1cm}}^\circ$



$\angle 6$  and  $\angle 8$  are supplementary angles. Measure and record each angle.  $m\angle 6 = \underline{\hspace{1cm}}^\circ$   $m\angle 8 = \underline{\hspace{1cm}}^\circ$

$\angle 8$  and  $\angle 7$  are supplementary angles. Measure and record each angle.  $m\angle 8 = \underline{\hspace{1cm}}^\circ$   $m\angle 7 = \underline{\hspace{1cm}}^\circ$



What is the relationship between the measures of supplementary angles?

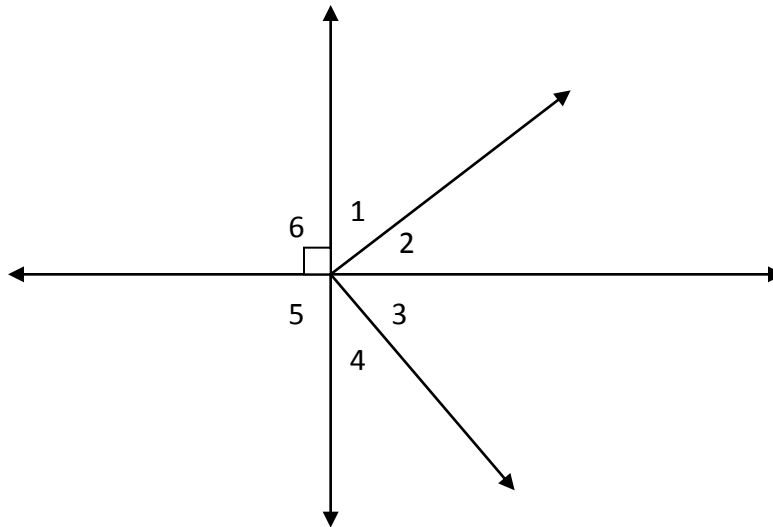
Draw a pair of supplementary angles.

Write a definition of supplementary angles.

Use your figure to test your definition. Does your definition hold true? Why, or why not? Write a new definition, if necessary.

**Complementary Angles**

$\angle 1$  and  $\angle 2$  are complementary angles. Measure and record each angle.  $m\angle 1 = \underline{\hspace{1cm}}^\circ$   $m\angle 2 = \underline{\hspace{1cm}}^\circ$   
 $\angle 3$  and  $\angle 4$  are complementary angles. Measure and record each angle.  $m\angle 3 = \underline{\hspace{1cm}}^\circ$   $m\angle 4 = \underline{\hspace{1cm}}^\circ$



What is the relationship between the measures of complementary angles?

Draw a pair of complementary angles.

Write a definition of complementary angles.

Use your figure to test your definition. Does your definition hold true? Why, or why not? Write a new definition below if necessary.

**Adjacent Angles**

$\angle 1$  and  $\angle 2$  are adjacent angles.  $\angle 2$  and  $\angle 3$  are adjacent angles.  $\angle 4$  and  $\angle 5$  are adjacent angles.  
 What does *adjacent* means? \_\_\_\_\_ What angles are adjacent to  $\angle 6$ ? \_\_\_\_\_

