

**1.6****Describing Pairs of Angles**

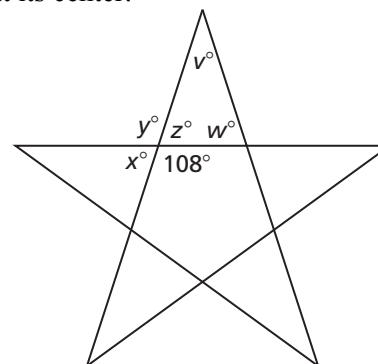
For use with Exploration 1.6

**Essential Question** How can you describe angle pair relationships and use these descriptions to find angle measures?

**1 EXPLORATION:** Finding Angle Measures

**Work with a partner.** The five-pointed star has a regular pentagon at its center.

- a. What do you notice about the following angle pairs?

 $x^\circ$  and  $y^\circ$  $y^\circ$  and  $z^\circ$  $x^\circ$  and  $z^\circ$ 

- b. Find the values of the indicated variables. Do not use a protractor to measure the angles.

 $x =$  $y =$  $z =$  $w =$  $v =$ 

Explain how you obtained each answer.

**1.6 Describing Pairs of Angles (continued)****2 EXPLORATION:** Finding Angle Measures

**Work with a partner.** A square is divided by its diagonals into four triangles.

- a. What do you notice about the following angle pairs?

$a^\circ$  and  $b^\circ$

$c^\circ$  and  $d^\circ$

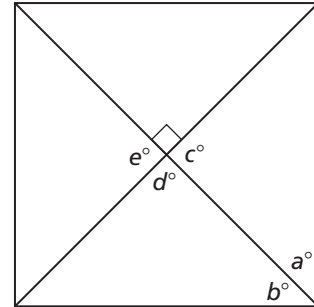
$c^\circ$  and  $e^\circ$

- b. Find the values of the indicated variables. Do not use a protractor to measure the angles.

$c =$

$d =$

$e =$



Explain how you obtained each answer.

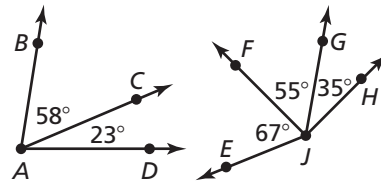
**Communicate Your Answer**

3. How can you describe angle pair relationships and use these descriptions to find angle measures?
4. What do you notice about the angle measures of complementary angles, supplementary angles, and vertical angles?

# 1.6 Practice

In Exercises 1–3, use the figures.

1. Name a pair of adjacent complementary angles.
2. Name a pair of nonadjacent complementary angles.
3. Name a pair of nonadjacent supplementary angles.



In Exercises 4 and 5, find the angle measure.

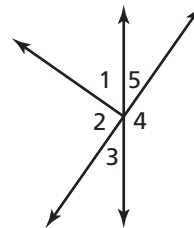
4.  $\angle 1$  is a complement of  $\angle 2$ , and  $m\angle 2 = 36^\circ$ . Find  $m\angle 1$ .
5.  $\angle 3$  is a supplement of  $\angle 4$ , and  $m\angle 4 = 75^\circ$ . Find  $m\angle 3$ .

In Exercises 6 and 7, find the measure of each angle.

6.  $\angle WXY$  and  $\angle YXZ$  are supplementary angles,  $m\angle WXY = (6x + 59)^\circ$ , and  $m\angle YXZ = (3x - 14)^\circ$ .
7.  $\angle ABC$  and  $\angle CBD$  are complementary angles,  $m\angle ABC = (3x + 6)^\circ$ , and  $m\angle CBD = (4x - 14)^\circ$ .

In Exercises 8–10, use the figure.

8. Identify the linear pairs that include  $\angle 5$ .
9. Are  $\angle 3$  and  $\angle 5$  vertical angles? Explain your reasoning.
10. Are  $\angle 2$  and  $\angle 4$  vertical angles? Explain your reasoning.



In Exercises 11–13, write and solve an algebraic equation to find the measure of each angle based on the given description.

11. Two angles form a linear pair. The measure of one angle is  $24^\circ$  more than the measure of the other angle.
12. The measure of an angle is three times the measurement of its complement.
13. The measure of one angle is 15 less than half the measurement of its supplement.
14. The figure shows the design on an outdoor fence.

- a. Name a pair of adjacent supplementary angles.
- b. Name a pair of nonadjacent supplementary angles.
- c. Identify the linear pairs that include  $\angle 5$ .
- d. Find  $m\angle 3$ . Explain your reasoning.

