

Angle Connection Quest

Use angle relationships to find missing measures.

GRADE 8 • MA.8.GR.1.4

MA.8.GR.1.4 "Solve mathematical problems involving the relationships between supplementary, complementary, vertical or adjacent angles."

NAME _____

DATE _____

ANGLE RELATIONSHIP RULES

Complementary angles add to 90 degrees, and supplementary angles add to 180 degrees. Vertical angles, which are opposite angles where lines cross, have equal measures. Adjacent angles share a vertex and a side, and they may form a right angle or a straight line.

WORKED EXAMPLE

Two complementary angles have measures x degrees and 71 degrees. Find x .

1. Complementary angles add to 90 degrees.

$$2. x + 71 = 90$$

$$3. x = 19$$

Answer: $x = 19$ degrees

PRACTICE 6 problems

- 1** Two supplementary angles have measures x degrees and 124 degrees. Find x .

ANSWER _____

- 2** Two complementary angles have measures 38 degrees and x degrees. Find x .

ANSWER _____

- 3** Two vertical angles have measures $(7x - 5)$ degrees and 121 degrees. Find x .

ANSWER _____

- 4** Two adjacent angles form a straight line. Their measures are $(3x + 12)$ degrees and $(2x + 18)$ degrees. Find x and both angle measures.

ANSWER _____

- 5** Two vertical angles have measures $(x + 42)$ degrees and $(4x - 18)$ degrees. Find x and the angle measure.

ANSWER _____

- 6** Two adjacent angles form a right angle. Their measures are $6x$ degrees and $(x + 27)$ degrees. Find x and both angle measures.

ANSWER _____

APPLY IT Show your work

- 1** At a concert, two beams from moving lights cross on a wall. One angle at the crossing is 68 degrees. What is the measure of an angle next to it?

WORK SPACE

ANSWER _____

- 2** In a video game map, two straight paths cross. One angle measures $(4x + 6)$ degrees, and its vertical angle measures 94 degrees. Find x .

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

Two adjacent angles formed by intersecting lines measure $(3x + 15)$ degrees and $(5x - 19)$ degrees. Find x , then list the measures of all four angles at the intersection.

PART 1 • PRACTICE

#	PROBLEM	ANSWER
1	Two supplementary angles have measures x degrees and 124 degrees. Find x .	$x = 56$ degrees
2	Two complementary angles have measures 38 degrees and x degrees. Find x .	$x = 52$ degrees
3	Two vertical angles have measures $(7x - 5)$ degrees and 121 degrees. Find x .	$x = 18$
4	Two adjacent angles form a straight line. Their measures are $(3x + 12)$ degrees and $(2x + 18)$ degrees. Find x and both angle measures.	$x = 30$; the angles are 102 degrees and 78 degrees
5	Two vertical angles have measures $(x + 42)$ degrees and $(4x - 18)$ degrees. Find x and the angle measure.	$x = 20$; each vertical angle measures 62 degrees
6	Two adjacent angles form a right angle. Their measures are $6x$ degrees and $(x + 27)$ degrees. Find x and both angle measures.	$x = 9$; the angles are 54 degrees and 36 degrees

PART 2 • APPLY IT

- 112 degrees** The angle next to the 68-degree angle is supplementary to it. Subtract 68 from 180 to get 112 degrees.
- $x = 22$** Vertical angles are equal, so set $4x + 6$ equal to 94. Subtract 6, then divide by 4.

CHALLENGE

$x = 23$; the four angles measure 84 degrees, 96 degrees, 84 degrees, and 96 degrees

Accept angle measures in either order when two measures are requested. For the challenge, accept any order that correctly shows two 84-degree angles and two 96-degree angles.