LESSON MAKER PRO

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."

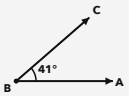
NAME _____ DATE _____

ANGLE RELATIONSHIP RULES

Complementary angles add to 90°, and supplementary angles add to 180°. Vertical angles are opposite angles made by intersecting lines, so they have equal measures. Adjacent angles share a vertex and one side, so you can add their measures when they form a larger angle.

WORKED EXAMPLE

The figure shows m∠ABC = 41°. A second angle is complementary to ∠ABC. Find the measure of the second angle.

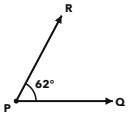


1. Complementary angles add to 90°.
2. Write 41 + x = 90.
3. Subtract 41 from 90: x = 49.

Answer: 49°

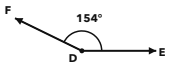
PRACTICE 6 problems

1 The figure shows an angle measuring 62°. This angle and a second angle are complementary. Find the measure of the second angle.



ANSWER _____

2 The figure shows an angle measuring 154°. This angle and a neighboring angle form a straight line. Find the measure of the neighboring angle.



ANSWER _____

3 Two lines intersect. One angle measures 73°. Find the measure of its vertical angle.

ANSWER _____

4 Ray BD lies inside ∠ABC. m∠ABD = 48° and m∠DBC = 39°. Find m∠ABC.

ANSWER _____

5 Two adjacent angles form a straight line. Their measures are 5x + 8 and 3x + 12. Find x.

ANSWER _____

6 Two vertical angles have measures 6x - 9 and 3x + 30. Find x and the measure of each vertical angle.

ANSWER _____

APPLY IT Show your work

1 During a livestream setup, two cables cross. One angle between the cables measures 112°. What is the measure of each angle adjacent to the 112° angle?

WORK SPACE

ANSWER _____

2 At a game-design club, Zara divides a right-angle corner in her logo into two adjacent angles. Their measures are 4x + 6 and 2x + 18. Find x and the measure of each angle.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two lines intersect to form ∠1, ∠2, ∠3, and ∠4 in order around the intersection. ∠1 and ∠2 are adjacent. If m∠1 = 3x + 21 and m∠2 = 5x - 9, find x and all four angle measures. Explain how you know which angles have equal measures.

WORK SPACE AND ANSWER

ANSWER KEY

Angle Connection Quest

GRADE 8 · MA.8.GR.1.4

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The figure shows an angle measuring 62°. This angle and a second angle are complementary. Find the measure of the second angle.	**28°**
2	The figure shows an angle measuring 154°. This angle and a neighboring angle form a straight line. Find the measure of the neighboring angle.	**26°**
3	Two lines intersect. One angle measures 73°. Find the measure of its vertical angle.	**73°**
4	Ray BD lies inside ∠ABC. m∠ABD = 48° and m∠DBC = 39°. Find m∠ABC.	**87°**
5	Two adjacent angles form a straight line. Their measures are 5x + 8 and 3x + 12. Find x.	**x = 20**
6	Two vertical angles have measures 6x - 9 and 3x + 30. Find x and the measure of each vertical angle.	**x = 13; each vertical angle measures 69°**

PART 2 · APPLY IT

1. **68° each** Each adjacent angle forms a straight line with the 112° angle. Calculate 180 - 112 = 68.
2. **x = 11; the angles measure 50° and 40°** The two angles are complementary, so (4x + 6) + (2x + 18) = 90. Solve x = 11, then substitute to find 50° and 40°.

CHALLENGE

x = 21. m∠1 = 84°, m∠2 = 96°, m∠3 = 84°, and m∠4 = 96°. ∠1 and ∠2 are supplementary, so their measures add to 180°. Vertical angles are equal, so ∠1 = ∠3 and ∠2 = ∠4.

Accept angle measures written with or without the degree symbol when the value is correct. For the challenge, students should identify both the supplementary pair and the equal vertical-angle pairs.