LESSON MAKER PRO

Angle Equation Quest

Use angle facts to solve for x.

GRADE 7 · 7.G.B.5

CCSS.Math.Content.7.G.B.5 "Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve simple equations for an unknown angle in a figure."

NAME _____ DATE _____

ANGLE FACTS

Adjacent angles share a side. Vertical angles are equal, complementary angles add to 90 degrees, and supplementary angles add to 180 degrees. Write an equation from the angle relationship, then solve for x.

WORKED EXAMPLE

Two vertical angles measure (6x + 17) degrees and (3x + 41) degrees. Find x.

1. Set equal: 6x + 17 = 3x + 41.
2. Subtract 3x: 3x + 17 = 41.
3. Subtract 17: 3x = 24.
4. Divide by 3: x = 8.

Answer: x = 8; each vertical angle is 65 degrees.

PRACTICE 5 problems

1 Two adjacent supplementary angles measure (7x + 5) degrees and (4x + 10) degrees. Find x and both angle measures.

ANSWER _____

2 Two complementary angles measure (9x + 7) degrees and (x + 13) degrees. Find x and both angle measures.

ANSWER _____

3 Two vertical angles measure (12x - 10) degrees and (5x + 39) degrees. Find x and the angle measure.

ANSWER _____

4 Two vertical angles measure (11x + 1) degrees and (4x + 50) degrees. Find x, then find an angle adjacent to either angle.

ANSWER _____

5 Two complementary angles measure (16x - 5) degrees and (4x + 15) degrees. Find x and both angle measures.

ANSWER _____

APPLY IT Show your work

1 At a skate park, a straight ramp edge and a safety rail make two adjacent angles. The angles measure (12x + 9) degrees and (5x + 1) degrees. Find x and both angle measures.

WORK SPACE

ANSWER _____

2 In an escape-room game, two laser beams cross. Opposite angles measure (13x - 7) degrees and (7x + 35) degrees. Find x and the measure of each opposite angle.

WORK SPACE

ANSWER _____

CHALLENGE One step up

CHALLENGE

A straight angle is split into three adjacent angles measuring (7x + 7) degrees, (4x + 9) degrees, and (5x + 4) degrees. Find x and all three angle measures.

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ANSWER KEY

Angle Equation Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Two adjacent supplementary angles measure (7x + 5) degrees and (4x + 10) degrees. Find x and both angle measures.	**x = 15; angles are 110 degrees and 70 degrees.**
2	Two complementary angles measure (9x + 7) degrees and (x + 13) degrees. Find x and both angle measures.	**x = 7; angles are 70 degrees and 20 degrees.**
3	Two vertical angles measure (12x - 10) degrees and (5x + 39) degrees. Find x and the angle measure.	**x = 7; each vertical angle is 74 degrees.**
4	Two vertical angles measure (11x + 1) degrees and (4x + 50) degrees. Find x, then find an angle adjacent to either angle.	**x = 7; each vertical angle is 78 degrees, and an adjacent angle is 102 degrees.**
5	Two complementary angles measure (16x - 5) degrees and (4x + 15) degrees. Find x and both angle measures.	**x = 4; angles are 59 degrees and 31 degrees.**

PART 2 · APPLY IT

1. **x = 10; angles are 129 degrees and 51 degrees.** The adjacent angles form a straight angle, so their measures add to 180 degrees. Write a supplementary-angle equation and solve.
2. **x = 7; each opposite angle is 84 degrees.** Opposite angles formed by intersecting lines are vertical angles, so they are equal. Set the expressions equal and solve.

CHALLENGE

x = 10; the angles are 77 degrees, 49 degrees, and 54 degrees.

Accept angle measures in any order when the problem does not name a specific angle. Students may use equivalent equation steps.