LESSON MAKER PRO

Angle Equation Quest

Use angle facts to write and solve equations.

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."

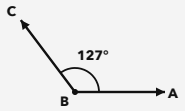
NAME _____ DATE _____

ANGLE FACTS

Adjacent angles share a vertex and a side. Adjacent angles that make a straight angle total 180°, and adjacent angles that make a right angle total 90°. Vertical angles have equal measures.

WORKED EXAMPLE

The angle shown measures 127°. It is supplementary to an angle that measures x°. Find x.

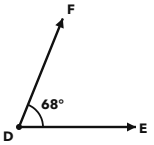


1. Supplementary angles total 180°.
2. x + 127 = 180
3. x = 53

Answer: 53°

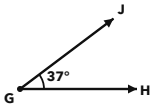
PRACTICE 6 problems

1 The angle shown is supplementary to an angle that measures 5x + 2°. Find x.



ANSWER _____

2 The angle shown is complementary to an angle that measures 4x + 5°. Find x.



ANSWER _____

3 Two vertical angles measure 7x - 9° and 5x + 27°. Find x and the measure of each vertical angle.

ANSWER _____

4 Two adjacent angles form a straight angle. Their measures are 3x + 14° and 6x - 5°. Find x and both angle measures.

ANSWER _____

5 Two adjacent angles form a right angle. Their measures are 2x + 16° and x + 8°. Find x.

ANSWER _____

6 Two vertical angles measure 8x - 17° and 5x + 34°. Find x and the measure of each vertical angle.

ANSWER _____

APPLY IT Show your work

1 A skate park designer divides a straight painted edge into two adjacent angle sections. The sections measure 4x + 12° and 2x + 36°. Find x and the measure of each section.

WORK SPACE

ANSWER _____

2 Two metal braces cross in a phone stand. One angle and its vertical opposite angle measure 9x - 24° and 6x + 21°. Find x and the measure of those vertical angles.

WORK SPACE

ANSWER _____

CHALLENGE One step up

At an intersection, one angle measures x + 29° and its vertical opposite angle measures 3x - 15°. Explain how to find x and the measures of all four angles.

WORK SPACE AND ANSWER

ANSWER KEY

Angle Equation Quest

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PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The angle shown is supplementary to an angle that measures 5x + 2°. Find x.	**x = 22**
2	The angle shown is complementary to an angle that measures 4x + 5°. Find x.	**x = 12**
3	Two vertical angles measure 7x - 9° and 5x + 27°. Find x and the measure of each vertical angle.	**x = 18; each vertical angle measures 117°**
4	Two adjacent angles form a straight angle. Their measures are 3x + 14° and 6x - 5°. Find x and both angle measures.	**x = 19; the angles measure 71° and 109°**
5	Two adjacent angles form a right angle. Their measures are 2x + 16° and x + 8°. Find x.	**x = 22**
6	Two vertical angles measure 8x - 17° and 5x + 34°. Find x and the measure of each vertical angle.	**x = 17; each vertical angle measures 119°**

PART 2 · APPLY IT

1. **x = 22; the sections measure 100° and 80°** Because the sections form a straight angle, write 4x + 12 + 2x + 36 = 180. Solve for x, then substitute 22 into each expression.
2. **x = 15; each vertical angle measures 111°** Vertical angles are equal, so write 9x - 24 = 6x + 21. Solve for x, then substitute 15 into either expression.

CHALLENGE

Set the vertical angles equal: x + 29 = 3x - 15. Then x = 22, so the vertical angles are 51° each. Each adjacent angle is 180 - 51 = 129°, so the four angles are 51°, 129°, 51°, and 129°.

Accept equations that correctly use 180° for supplementary adjacent angles, 90° for complementary adjacent angles, or equal measures for vertical angles. Angle measures may be listed in either order when the two angles have different measures.