LESSON MAKER PRO

Angle Equation Quest

Use angle facts to solve for unknown measures.

GRADE 7 · 7.GSR.5.3

7.GSR.5.3 "Use facts about supplementary, complementary, vertical, and adjacent angles in a multi-step problem to write and solve equations for an unknown angle in a figure."

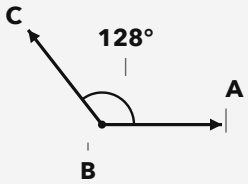
NAME _____ DATE _____

ANGLE FACTS THAT HELP

Adjacent angles share a vertex and a side. A linear pair is supplementary, so its measures total 180°, while angles that form a right angle are complementary, so they total 90°. Vertical angles have equal measures.

WORKED EXAMPLE

The marked angle and x form a straight angle. Find x.

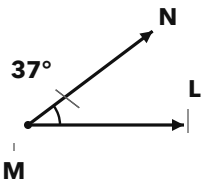


1. A straight angle measures 180°, so x + 128 = 180.
2. Subtract 128 from both sides: x = 52.
3. The unknown angle measures 52°.

Answer: x = 52

PRACTICE 6 problems

1 The marked angle in the figure and x form a right angle. Find x.



ANSWER _____

2 Two lines intersect. One angle measures 96°, and its vertical angle measures (3x + 15)°. Find x.

ANSWER _____

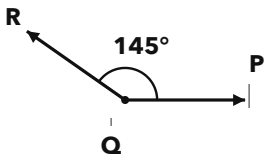
3 Two adjacent angles form a straight line. Their measures are (5x - 8)° and (2x + 20)°. Find x.

ANSWER _____

4 Two adjacent angles form a right angle. Their measures are (4x + 6)° and (2x + 12)°. Find x.

ANSWER _____

5 The marked angle in the figure and an adjacent angle measuring (x + 11)° form a straight angle. Find x.



ANSWER _____

6 Two adjacent angles form a linear pair. Their measures are (7x - 9)° and (3x + 29)°. Find x.

ANSWER _____

APPLY IT Show your work

1 At a skateboard park, two painted paths cross. One angle between the paths is 102°. The vertical opposite angle measures (4x + 18)°. Find x. Then find the measure of each angle adjacent to the 102° angle.

WORK SPACE

ANSWER _____

2 In a robotics club, two metal braces cross to make an X. Two adjacent angles measure (6x - 14)° and (2x + 26)°. Find x and both angle measures.

WORK SPACE

ANSWER _____

CHALLENGE One step up

Two straight lines intersect. Going around the intersection, the four angle measures are (2x + 11)°, (4x + 1)°, (2x + 11)°, and (4x + 1)°. Find x, list all four angle measures in order, and explain in one sentence which angle facts support your result.

WORK SPACE AND ANSWER

ANSWER KEY

Angle Equation Quest

GRADE 7 · 7.GSR.5.3

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	The marked angle in the figure and x form a right angle. Find x.	**x = 53**
2	Two lines intersect. One angle measures 96°, and its vertical angle measures (3x + 15)°. Find x.	**x = 27**
3	Two adjacent angles form a straight line. Their measures are (5x - 8)° and (2x + 20)°. Find x.	**x = 24**
4	Two adjacent angles form a right angle. Their measures are (4x + 6)° and (2x + 12)°. Find x.	**x = 12**
5	The marked angle in the figure and an adjacent angle measuring (x + 11)° form a straight angle. Find x.	**x = 24**
6	Two adjacent angles form a linear pair. Their measures are (7x - 9)° and (3x + 29)°. Find x.	**x = 16**

PART 2 · APPLY IT

1. **x = 21; each adjacent angle measures 78°** Set the vertical angles equal: 4x + 18 = 102, so x = 21. Each angle adjacent to 102° is supplementary to it, so each measures 78°.
2. **x = 21; the angle measures are 112° and 68°** Adjacent angles in a linear pair total 180°, so (6x - 14) + (2x + 26) = 180. Solving gives x = 21, and substituting gives 112° and 68°.

CHALLENGE

x = 28; 67°, 113°, 67°, 113°; adjacent angles are supplementary, and vertical angles are equal.

Accept equivalent equation work and angle measures written with or without the degree symbol. For the challenge, accept any accurate sentence that names supplementary adjacent angles and equal vertical angles.