LESSON MAKER PRO

Angle Design Lab

Use angle relationships to find unknown measures.

HIGH SCHOOL · G.2D.1.3

G.2D.1.3 "Apply the properties of angles (corresponding, exterior, interior, vertical, complementary, supplementary) to solve problems using mathematical models, algebraic reasoning, and proofs."

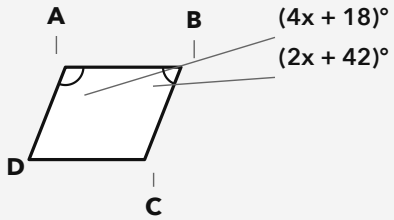
NAME _____ DATE _____

CHOOSE THE RELATIONSHIP

Vertical angles are equal. Angles that form a straight line, including an exterior angle and its adjacent interior angle, add to 180°. Angles that form a right angle add to 90°. In a parallelogram, opposite angles are equal and adjacent angles add to 180°.

WORKED EXAMPLE

In the parallelogram, find x and the measures of angles A and B.

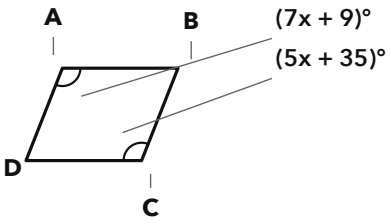


1. Adjacent angles add to 180°: (4x + 18) + (2x + 42) = 180.
2. Combine like terms: 6x + 60 = 180.
3. Solve: 6x = 120, so x = 20.
4. Angle A = 4(20) + 18 = 98°; angle B = 2(20) + 42 = 82°.

Answer: x = 20; angle A = 98°; angle B = 82°

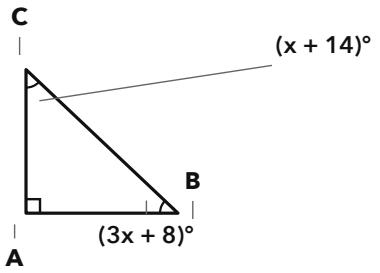
PRACTICE 6 problems

1 Find x using the marked angles.



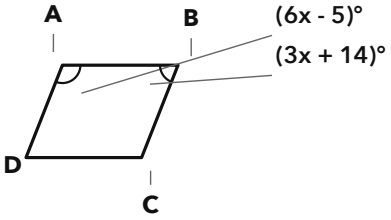
ANSWER _____

2 Find x using the marked angles.



ANSWER _____

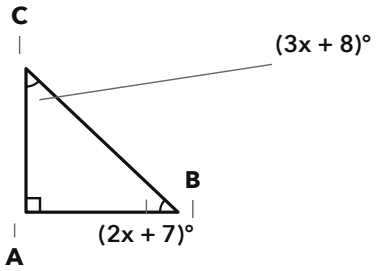
3 Find x and the measure of the larger marked angle.



ANSWER _____

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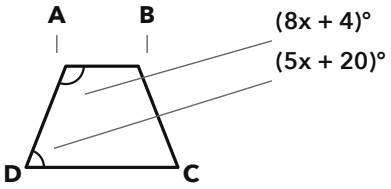
4 Find x and the measure of angle C.



ANSWER _____

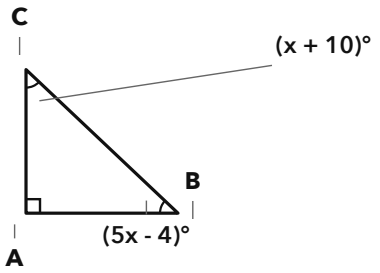
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5 Find x using the marked angles in the trapezoid.



ANSWER _____

6 Find x and the measure of angle B.

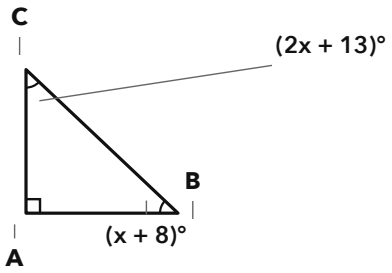


ANSWER _____

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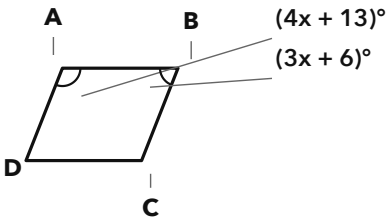
APPLY IT Show your work

1 A skateboard ramp forms triangle ABC. AB is the ground, AC is the vertical height, and BC is the ramp. What angle does the ramp make with the ground?



ANSWER _____

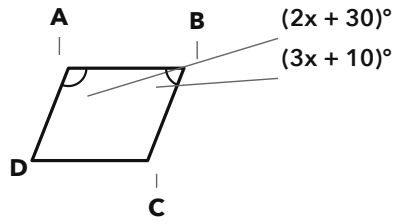
2 A graphic designer makes the parallelogram logo shown. What is the measure of angle B?



ANSWER _____

CHALLENGE One step up

Find x and the measure of angle C. Explain which angle relationships you used.



WORK SPACE AND ANSWER

ANSWER KEY # Angle Design Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find x using the marked angles.	**x = 13**
2	Find x using the marked angles.	**x = 17**
3	Find x and the measure of the larger marked angle.	**x = 19; larger marked angle = 109°**
4	Find x and the measure of angle C.	**x = 15; angle C = 53°**
5	Find x using the marked angles in the trapezoid.	**x = 12**
6	Find x and the measure of angle B.	**x = 14; angle B = 66°**

PART 2 · APPLY IT

1. **31°** The two acute angles add to 90°, so (x + 8) + (2x + 13) = 90 and x = 23. The ramp meets the ground at B, where the angle is 23 + 8 = 31°.
2. **75°** Adjacent angles add to 180°, so (4x + 13) + (3x + 6) = 180 and x = 23. Angle B measures 3(23) + 6 = 75°.

CHALLENGE

x = 28; angle C = 86°. Adjacent angles A and B add to 180°, giving 5x + 40 = 180. Opposite angles A and C are equal, so angle C = 2(28) + 30 = 86°.

For problems asking only for x, no angle measure is required. Accept equivalent explanations that identify the correct angle relationship.