LESSON MAKER PRO

Polygon Angle Lab

Use angle sums to uncover missing measures and side counts.

HIGH SCHOOL · G.2D.1.4

G.2D.1.4 "Apply theorems involving the interior and exterior angle sums of polygons to solve problems using mathematical models, algebraic reasoning, and proofs."

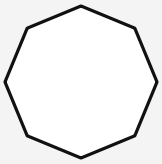
NAME _____ DATE _____

ANGLE SUM RULES

For a polygon with n sides, the interior angles add to (n - 2) × 180°. One exterior angle at each vertex adds to 360°. In a regular polygon, all interior angles are equal, and all exterior angles are equal.

WORKED EXAMPLE

The polygon shown is regular. Find one interior angle.

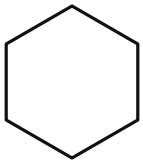


1. The polygon has 8 sides, so 8 - 2 = 6.
2. The interior-angle sum is 6 × 180° = 1080°.
3. Each interior angle is 1080° / 8 = 135°.

Answer: 135°

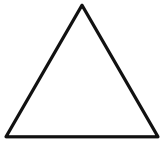
PRACTICE 6 problems

1 Find the sum of the interior angles of the polygon shown.



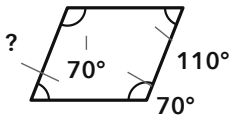
ANSWER _____

2 The polygon shown is regular. Find one exterior angle.



ANSWER _____

3 Find the angle marked ? in the figure.



ANSWER _____

4 Find the sum of the interior angles of a 9-sided polygon.

ANSWER _____

5 The five exterior angles of a polygon are x°, (x + 10)°, (x + 20)°, (x + 30)°, and (x + 40)°. Find x.

ANSWER _____

6 A polygon's interior angles add to 1620°. How many sides does it have?

ANSWER _____

APPLY IT Show your work

1 A concert stage has the shape of a regular 18-sided polygon. A light strip turns at each corner as it follows the stage's edge. What is the exterior turning angle at each corner?

WORK SPACE

ANSWER _____

2 A gaming club orders a regular 10-sided table. What is the measure of one interior angle at a corner of the tabletop?

WORK SPACE

ANSWER _____

CHALLENGE One step up

A polygon's interior-angle sum is six times its exterior-angle sum. How many sides does the polygon have? Show an equation that justifies your answer.

WORK SPACE AND ANSWER

ANSWER KEY # Polygon Angle Lab

PART 1 · PRACTICE

#	PROBLEM	ANSWER
1	Find the sum of the interior angles of the polygon shown.	**720°**
2	The polygon shown is regular. Find one exterior angle.	**120°**
3	Find the angle marked ? in the figure.	**110°**
4	Find the sum of the interior angles of a 9-sided polygon.	**1260°**
5	The five exterior angles of a polygon are x°, (x + 10)°, (x + 20)°, (x + 30)°, and (x + 40)°. Find x.	**x = 52**
6	A polygon's interior angles add to 1620°. How many sides does it have?	**11 sides**

PART 2 · APPLY IT

1. **20°** The exterior angles total 360°. Divide by 18 to get 20° at each corner.
2. **144°** The interior-angle sum is (10 - 2) × 180° = 1440°. Divide by 10 to get 144°.

CHALLENGE

14 sides. Since the exterior-angle sum is 360°, (n - 2) × 180° = 6 × 360°. Thus n - 2 = 12, so n = 14.

For problem 5, accept x = 52 without a degree symbol because x is the number multiplied by the degree symbol in each expression. For the challenge, accept any equivalent equation using an exterior-angle sum of 360°.