

sum of interior angles of a polygon worksheet with answers

Sum of interior angles of a polygon worksheet with answers is a fundamental topic in geometry that plays a crucial role in understanding the properties of different polygon shapes. This article will delve into the concept of interior angles in polygons, provide a detailed explanation of how to calculate the sum of these angles, present a worksheet with various exercises, and finally provide the answers, ensuring a comprehensive understanding of the topic.

Understanding Polygons

Polygons are two-dimensional shapes made up of straight lines that connect to form a closed figure. The simplest polygon is a triangle, followed by quadrilaterals (four sides), pentagons (five sides), hexagons (six sides), and so on. Each polygon has its own unique properties, but one common feature is that they all have interior angles.

Types of Polygons

1. Triangles - 3 sides
2. Quadrilaterals - 4 sides
3. Pentagons - 5 sides
4. Hexagons - 6 sides
5. Heptagons - 7 sides
6. Octagons - 8 sides
7. Nonagons - 9 sides
8. Decagons - 10 sides

Sum of Interior Angles

The sum of the interior angles of a polygon depends on the number of sides (n) it has. The formula for calculating the sum of the interior angles of a polygon is:

$$\text{Sum of interior angles} = (n - 2) \times 180^\circ$$

Where:

- (n) = number of sides

This formula works because any polygon can be divided into triangles, and since each triangle has 180 degrees, we multiply the number of triangles in the polygon by 180 to find the total sum of the interior angles.

Examples

- Triangle (3 sides):

$$\text{Sum} = (3 - 2) \times 180^\circ = 1 \times 180^\circ = 180^\circ$$

- Quadrilateral (4 sides):

$$\text{Sum} = (4 - 2) \times 180^\circ = 2 \times 180^\circ = 360^\circ$$

- Pentagon (5 sides):

$$\text{Sum} = (5 - 2) \times 180^\circ = 3 \times 180^\circ = 540^\circ$$

- Hexagon (6 sides):

$$\text{Sum} = (6 - 2) \times 180^\circ = 4 \times 180^\circ = 720^\circ$$

Worksheet: Sum of Interior Angles of Polygons

Below is a worksheet designed to help students practice calculating the sum of interior angles for various polygons.

Instructions: For each polygon listed below, calculate the sum of the interior angles using the formula provided.

1. Calculate the sum of interior angles for the following polygons:

- a. Decagon (10 sides)
- b. Nonagon (9 sides)
- c. Heptagon (7 sides)
- d. Octagon (8 sides)
- e. Dodecagon (12 sides)

2. Determine the sum of the interior angles of the following irregular polygons:

- a. A polygon with 15 sides
- b. A polygon with 20 sides

3. Bonus Question: If one interior angle of a regular pentagon is 108

degrees, how many degrees are left for the other four angles?

Answers to the Worksheet

Now, let's provide the answers to the worksheet to assist students in verifying their calculations.

1. Calculate the sum of interior angles for the following polygons:

- a. Decagon (10 sides):

$$\text{Sum} = (10 - 2) \times 180^\circ = 8 \times 180^\circ = 1440^\circ$$

- b. Nonagon (9 sides):

$$\text{Sum} = (9 - 2) \times 180^\circ = 7 \times 180^\circ = 1260^\circ$$

- c. Heptagon (7 sides):

$$\text{Sum} = (7 - 2) \times 180^\circ = 5 \times 180^\circ = 900^\circ$$

- d. Octagon (8 sides):

$$\text{Sum} = (8 - 2) \times 180^\circ = 6 \times 180^\circ = 1080^\circ$$

- e. Dodecagon (12 sides):

$$\text{Sum} = (12 - 2) \times 180^\circ = 10 \times 180^\circ = 1800^\circ$$

2. Determine the sum of the interior angles of the following irregular polygons:

- a. A polygon with 15 sides:

$$\text{Sum} = (15 - 2) \times 180^\circ = 13 \times 180^\circ = 2340^\circ$$

- b. A polygon with 20 sides:

$$\text{Sum} = (20 - 2) \times 180^\circ = 18 \times 180^\circ = 3240^\circ$$

3. Bonus Question:

- If one interior angle of a regular pentagon is 108 degrees, to find the

total for the other four angles:

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\text{Total sum of angles} = 540^\circ \quad (\text{from earlier calculation})

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\text{Sum of remaining angles} = 540^\circ - 108^\circ = 432^\circ

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In conclusion, the sum of interior angles of a polygon worksheet with answers serves as a valuable tool for students to practice and reinforce their understanding of this crucial geometric concept. By mastering the formula and practicing with a variety of polygons, learners can gain confidence in their ability to calculate and understand the properties of different shapes.

Frequently Asked Questions

What is the formula to calculate the sum of the interior angles of a polygon?

The formula to calculate the sum of the interior angles of a polygon is $(n - 2) 180^\circ$, where n is the number of sides of the polygon.

How do you find the sum of the interior angles for a hexagon using a worksheet?

For a hexagon, which has 6 sides, you would use the formula: $(6 - 2) 180^\circ = 4 180^\circ = 720^\circ$. Therefore, the sum of the interior angles of a hexagon is 720° .

Can you provide an example of a worksheet problem involving the sum of interior angles?

Sure! An example problem could be: 'Calculate the sum of the interior angles of a decagon.' The answer would be $(10 - 2) 180^\circ = 8 180^\circ = 1440^\circ$.

What is the sum of the interior angles of a triangle, and how is it represented in worksheets?

The sum of the interior angles of a triangle is always 180° . In worksheets, this is often represented alongside diagrams of triangles to illustrate the concept.

Are there worksheets available for practicing the

calculation of interior angles for various polygons?

Yes, there are many educational resources and worksheets available online that provide practice problems for calculating the sum of interior angles for various polygons.

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