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hi

Hello there! How can I assist you today?

tell me about the pytho gorus therom

Pythagorean Theorem

The Pythagorean theorem is a fundamental relation in Euclidean geometry that states that in a right-angled triangle, the square of the length of the hypotenuse (the side opposite the right angle) is equal to the sum of the squares of the lengths of the other two sides.

Statement:

$$a^2 + b^2 = c^2$$

where:

Your message

localhost:8501

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Applications:

The Pythagorean theorem has numerous applications in various fields:

- **Architecture:** Determining the heights of buildings and structures.
- **Civil engineering:** Calculating the lengths of bridges and other structures.
- **Land surveying:** Measuring distances and areas of land.
- **Trigonometry:** Deriving trigonometric ratios.
- **Navigation:** Finding the distance between two points on the Earth's surface.

Example:

Consider a right-angled triangle with legs of length 3 cm and 4 cm. Using the Pythagorean theorem, we can find the length of the hypotenuse:

$$3^2 + 4^2 = c^2 \quad 9 + 16 = c^2 \quad 25 = c^2 \quad c = \sqrt{25} \quad c = 5 \text{ cm}$$

Therefore, the length of the hypotenuse is 5 cm.

Proof:

There are various ways to prove the Pythagorean theorem, including:

- **Geometric proof:** Dividing the square on the hypotenuse into four right triangles and rearranging them to form squares on the legs.
- **Algebraic proof:** Using the properties of similar triangles.
- **Coordinate geometry proof:** Using the distance formula and the slopes of the lines forming the triangle.

Historical Significance:

The Pythagorean theorem is attributed to the Greek mathematician Pythagoras, who is believed to have lived in the 6th century BC. It is one of the oldest and most well-known mathematical theorems.