

Answer on Question #64032 – Math – Geometry

Question

A piece of wire of length 52 m is cut into two parts. Each part is then bent to form a square. It is found that the combined area of two squares is 109 m^2 . Find the measures of the sides of the two squares.

Solution

Let the side of the first square be x , and y be the side of the second square.

The combined area of two squares is

$$x^2 + y^2 = 109. \quad (1)$$

On the other hand, the perimeter of the first square is $4x$, and the perimeter of the second square is $4y$.

The sum of these perimeters is equal to the length of the wire:

$$4x + 4y = 52. \quad (2)$$

It follows from equation (2) that $y = \frac{52-4x}{4}$, that is, $y = 13 - x$ and substitute it into equation (1):

$$x^2 + (13 - x)^2 = 109;$$

$$x^2 + 169 - 26x + x^2 = 109;$$

$$2x^2 - 26x + 60 = 0;$$

$$x^2 - 13x + 30 = 0;$$

$$x = \frac{13 - \sqrt{(-13)^2 - 4 \cdot 1 \cdot 30}}{2} \text{ or } x = \frac{13 + \sqrt{(-13)^2 - 4 \cdot 1 \cdot 30}}{2};$$

$$x = \frac{13-7}{2} \text{ or } x = \frac{13+7}{2}.$$

$$x = 3 \text{ or } x = 10.$$

If $x = 3$, then $y = 10$, and vice versa. The measures of the sides of the two squares are 3 m and 10 m.

Answer:

3 m and 10 m