Mathematics

<u>question and solution</u>

Question:

(Please show your workings). Over all real numbers, find the minimum value of a positive real number, y such that:

y = sqrt((x+6)^2 + 25) + sqrt((x-6)^2 + 121)

Solution:

Step 1: Evaluating y:

$$y = \sqrt{(x+6)^2 + 25} + \sqrt{(x-6)^2 + 121}$$

$$y = \sqrt{((x+6) + 5)^2} + \sqrt{((x-6) + 11)}^2$$

$$y = (((x+6) + 5)^2)^{\frac{1}{2}} + (((x-6) + 11)^2)^{\frac{1}{2}}$$

$$y = (x+6) + 5 + (x-6) + 11$$

$$y = x + 11 + x + 4$$

$$y = 2x + 16$$

Step 2: Finding the minimun value of y:

Minimun positive real value for x = 0 therefore, calculating y at x = 0

$$y = 2(0) + 16$$

$$y = 0 + 16$$

$$\mathbf{y = 16} \quad (\text{at } x = 0)$$