

Answer on Question #82756 – Math – Calculus

Question

What is the minimum value of $y=x^2-4x-6$

Solution 1

$$y = ax^2 + bx + c \rightarrow a = 1, b = -4, c = -6$$

$a=1>0$ the parabola faces up and the vertex is the lowest point on the graph

the line of symmetry:

$$x = \frac{-b}{2a} = 2$$

the vertex:

$$x = 2 \rightarrow y = 1 \cdot 2^2 - 4 \cdot 2 - 6 = -10 \rightarrow (2, -10)$$

The minimum value of the function is $y(2)=-10$.

Answer: -10

Solution 2

the derivative of the function:

$$y'(x) = 2x - 4$$

one critical point:

$$y'(x) = 0 = 2x - 4 \rightarrow x = 2$$

the second derivative of the function:

$$y''(x) = 2 \rightarrow y''(2) = 2 > 0 \rightarrow x = 2 \text{ is a point of minimum}$$

The minimum value of the function is

$$y(2) = 2^2 - 4 \cdot 2 - 6 = -10$$

Answer: -10.

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