Answer on Question #85656 – Math – Calculus

Question

The function f, defined by $f(x) = x^2 - 2x + 7$, is monotonic in the interval $[1, \infty[$.
Is the statement true or false? Give reason to support your answer.

Solution

Function is called monotonic if and only if it is either entirely non-increasing, or entirely non-decreasing.

A function is monotonic if its first derivative does not change sign. Derivative changes sign at points where $f'(x) = 0$, so we find these points.

$$f'(x) = (x^2 - 2x + 7)' = 2x - 2$$

$$2x - 2 = 0$$

$$x = 1$$

The derivative of f(x) does not change sign in $[1, \infty[$, thus the function $f(x)$ is monotonic in the interval $[1, \infty[$.

Answer: The statement is true. The function $f(x) = x^2 - 2x + 7$ is monotonic in the interval $[1, \infty[$.