

Assignment troubleshoot due 09/27/2021 at 11:59pm ADT

Problem 1. (1 point)

In the following questions, consider the function

$$f(x) = x^3 + 18x^2 + 18.$$

Enter **DNE** if an answer does not exist. 1001Give the domain of f (in interval notation):
_____ help (intervals)

Find the critical numbers of f . _____ help (numbers)(Separate multiple answers with commas.)

Determine the intervals on which f is increasing and decreasing. f is increasing on: _____ f is decreasing on: _____

Use the First Derivative Test to determine whether each critical point is a relative maximum, minimum, or neither. Relative maxima occur at $x =$ _____ (Separate multiple answers with commas.) Relative minima occur at $x =$ _____ (Separate multiple answers with commas.)

Solution: (*Instructor solution preview: show the student solution after due date.*)

Since $f(x) = x^3 + 18x^2 + 18$ is a polynomial, its domain is all real numbers, or $(-\infty, \infty)$.

Its derivative is $f'(x) = 3x^2 + 36x$. Factor to find the two critical numbers, $x = -12, 0$.

Use the first derivative test, choosing sample points in each interval.

Interval	Sign of f' at sample	Conclusion
$(-\infty, -12)$	positive	increasing
$(-12, 0)$	negative	decreasing
$(0, \infty)$	positive	increasing

Based on the signs in each interval there is a relative maximum at $x = -12$ and a relative minimum at $x = 0$.

Answer(s) submitted:

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(incorrect)