

MTH 251Z Lab

First Derivative Test

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Prompts

1. Consider the function $f(x) = 2x^3 - 3x^2 - 36x + 1$ with domain $[-4, 0]$.
 - (a) Find the critical numbers of f .
 - (b) Use the First Derivative Test to find and classify the local extrema of f .
 - (c) Use the Closed Interval Method to find and classify the global extrema of f .
2. Consider the function $g(t) = \frac{1}{3}\sqrt{-t^2 + 4t + 77}$.
 - (a) What is the domain of g ?
 - (b) Graph g using Desmos.
 - (c) Use the First Derivative Test to find and classify the relative extrema of g .
 - (d) Use the Closed Interval Method to find and classify the absolute extrema of g .
3. Use the First Derivative Test to find and classify all of the local extrema of $f(x) = x\sqrt{2+x}$.
4. Use the First Derivative Test to find and classify all of the local extrema of $g(x) = \frac{x^2 - 1}{x^3}$.
5. Use the First Derivative Test to find and classify all of the local extrema of $h(x) = \ln(4 - x^2)$.
6. Use the First Derivative Test to find and classify all of the local extrema of $y = \sqrt[3]{x^3 + 1}$.