

Problem Definition

Problem 27. Find the absolute extrema for the function below on the given closed interval. Use a graphing utility to verify your results.

$$f(x) = 3x^{2/3} - 2x \quad [-1, 2]$$

Solution Step 1:

We start by computing the derivative of the function to find any critical points on the open interval $(-1, 2)$.

$$f'(x) = 2x^{-1/3} - 2$$

The derivative is zero at $x = 1$ and there is a problem at $x = 0$. The derivative is not defined at this point.

Solution Step 2:

To compute the absolute minimum and maximum values for a continuous function on a closed interval we just need to evaluate the function at the critical points and the endpoints. This gives the following list of values.

left end point, $x = -1$	$f(-1) = 5$	absolute maximum
critical point, $x = 0$	$f(0) = 0$	absolute minimum
critical point, $x = 1$	$f(1) = 1$	neither
right end point, $x = 2$	$f(2) \approx 0.762$	neither

The result just compares the values at the four points.