

FUN		
1	Topic: 5.5	Using the Candidate Test to Determine Absolute (Global) Extrema
Learning Objective FUN-4.A: Justify conclusions about the behavior of a function based on the behavior of its derivatives.		

Finding Absolute Extrema on a Closed Interval

Guidelines for Finding Absolute Extrema on a Closed Interval

To find extrema of a continuous function f on a closed interval $[a, b]$, use the following steps.

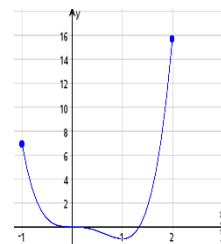
1. Find the critical numbers of f in (a, b) .
2. Evaluate f at each critical number in (a, b) .
3. Evaluate f at each endpoint of $[a, b]$.
4. The least of these f values is the **absolute** minimum. The greatest is the **absolute** maximum.

These two steps are referred to as the Candidates Test

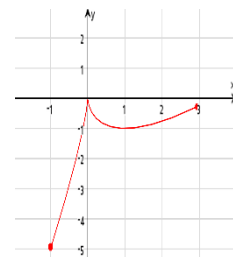
Note: The actual maximum or minimum value is a y value. Where the maximum or minimum occurs would be an x value.

Example 1: Finding Absolute Extrema on a Closed Interval

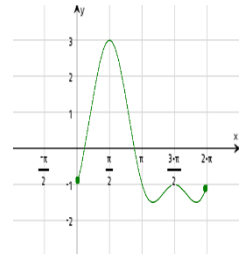
- a. Find the absolute extrema of $f(x) = 3x^4 - 4x^3$ on the interval $[-1, 2]$.



- b. Find the extrema of $f(x) = 2x - 3x^{\frac{2}{3}}$ on the interval $[-1, 3]$.



- c. Find the extrema of $f(x) = 2 \sin x - \cos(2x)$ on the interval $[0, 2\pi]$.



Example 2: Finding the Minimum/Maximum Velocity and Acceleration

- a.) A particle moves along a straight line with $s(t) = t^4 - 4t^3 + 6t^2 - 20$ for $0 \leq t \leq 3$, find the minimum and maximum velocity of the particle on the interval $0 \leq t \leq 3$.

- b.) the minimum and maximum acceleration of the particle on the interval $0 \leq t \leq 3$.