

Critical Numbers and Max / Min

Critical Numbers

Critical numbers of $f(x)$ are x -values of possible interior max and min points.

- $f'(x) = 0$
- $f'(x)$ does not exist

Max and Min Values on $[a, b]$

1. Solve $f'(x) = 0$ (*numerator = 0*)
2. Solve $f'(x)$ dne (*denominator = 0*)
3. Evaluate $f(x)$ at **solutions** and **endpoints**

1. (Critical Numbers) Compute the critical numbers for the functions below.

A. $f(x) = 5x^2 - 10x + 3$

B. $f(x) = \frac{x^2}{x^2 + 1}$

C. $f(x) = x^{1/3}$

D. $f(x) = |x^2 - 4|$

2. (Absolute Max and Min) Find the absolute maximum and minimum values on the given closed intervals.

A. $f(x) = 10 - 12x^2 + 4x^3 + 3x^4$ on $[-1, 1]$

B. $f(x) = x^{5/3} - 5x^{2/3}$ on $[-1, 1]$

C. $f(x) = \frac{x+2}{x^2+4x+5}$ on $[-2, 2]$

D. $f(x) = x^2 - |6x - 4|$ on $[-4, 3]$