Math 141 - Calculus

Section 4.3 Video Worksheet

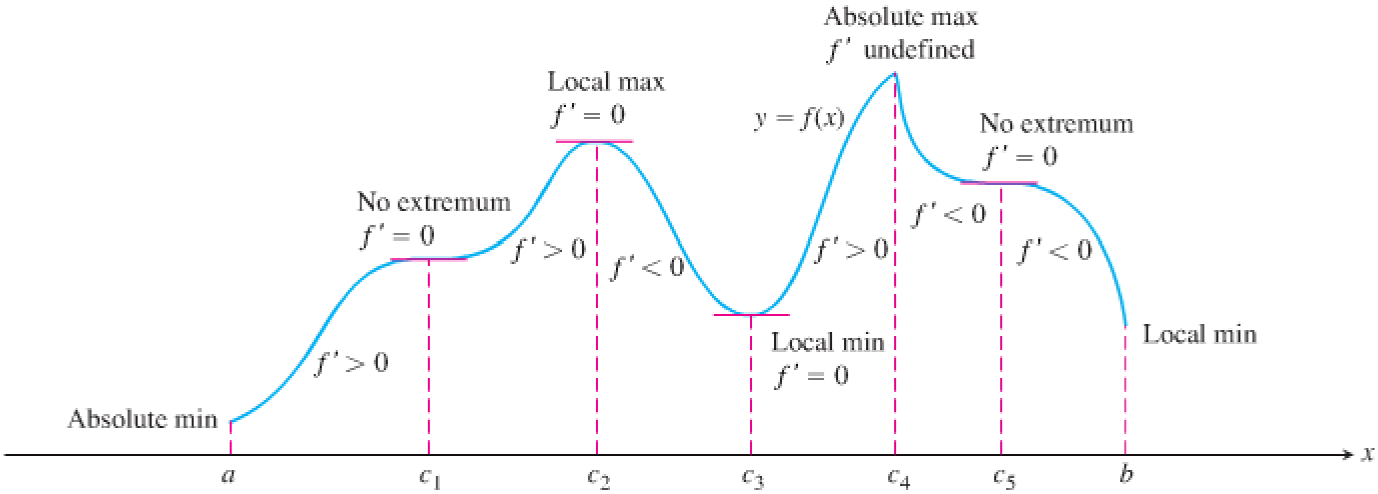
Name___________________

First Derivative Test

Increasing and Decreasing Functions

Monotonic

> **First Derivative Test for Local Extrema**
>
> Suppose that c is a critical point of a continuous function f, and that f is differentiable at every point in some interval containing c except possibly at c itself. Moving across this interval from left to right,
>
> **1.** if f' changes from negative to positive at c, then f has a local minimum at c;
>
> **2.** if f' changes from positive to negative at c, then f has a local maximum at c;
>
> **3.** if f' does not change sign at c (that is, f' is positive on both sides of c or negative on both sides), then f has no local extremum at c.



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Ex.) $f'(x) = x^{-\frac{1}{2}}(x-3)$

Ex.) $f(t) = t^3 - 3t^2$

Ex.) $f(\theta) = 6\theta - \theta^3$

Ex.) $f(x) = \sec^2 x - 2\tan x \qquad -\frac{\pi}{2} < x < \frac{\pi}{2}$

Try It: $f(x) = -2x + \tan x \qquad -\frac{\pi}{2} < x < \frac{\pi}{2}$