

First Derivative Test:

Let c be a critical number of the function f
that is continuous on an open interval I containing c .

If f is differentiable on I , except possibly at c ,
then $f(c)$ can be classified as follows.

- (1) If $f'(x)$ changes from negative to positive at c ,
then $f(c)$ is a relative minimum of f .
- (2) If $f'(x)$ changes from positive to negative at c ,
then $f(c)$ is a relative maximum of f .

First Derivative Test

After calculating any discontinuities of a function f and calculating the critical values of a function f ,
create a sign chart for f' , reflecting the domain, discontinuities, and critical values of a function f .

- A. If $f'(x)$ changes sign from negative to positive at $x = c$, then $f(c)$ is a relative minimum of f .
- B. If $f'(x)$ changes sign from positive to negative at $x = c$, then $f(c)$ is a relative maximum of f .

*If there is no sign change of $f'(x)$, there exists a shelf point