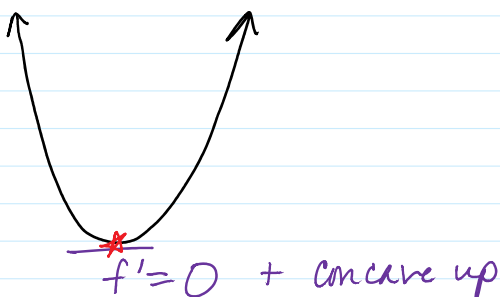
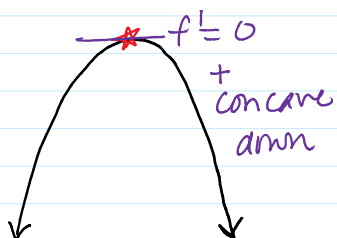


What's this called?



The Second Derivative Test

Suppose $f'(c) = 0$.

If $f''(c) < 0 \implies$ Local MAX

If $f''(c) > 0 \implies$ Local min



Example:

Let $f(x) = x^3 - 12x - 5$. Find the local extrema using the Second Derivative test.

$$f'(x) = 3x^2 - 12 = 0$$

$$3(x^2 - 4) = 0$$

$$3(x-2)(x+2) = 0$$

$$x = 2, -2$$

$$f''(x) = 6x$$

$$f''(-2) = -12$$

$$f''(2) = 12$$

There is a local max at $(-2, 11)$ because $f'(-2) = 0$ and $f''(-2) < 0$.

There is a local min at $(2, -21)$ because $f'(2) = 0$ and $f''(2) > 0$.