Extrema of a Function

Extrema are the absolute maximum and minimum of a function on an interval.

Absolute Max

Absolute Min
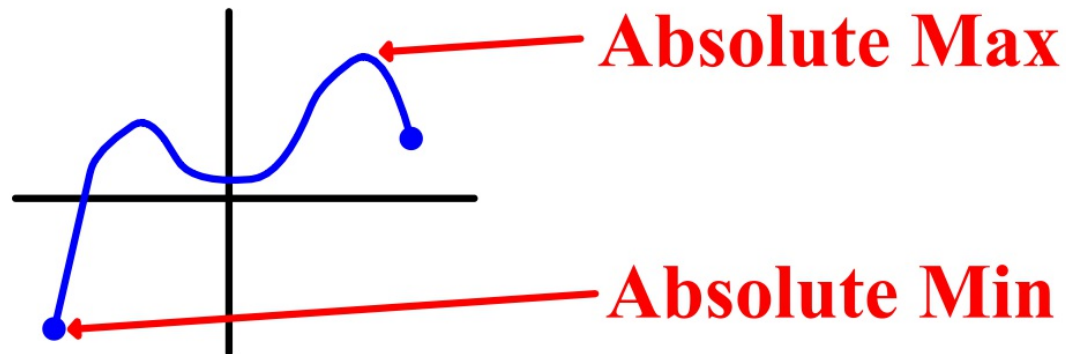
Relative extrema are values at the "peaks" and "valleys" of a function on an interval

Rel. Max

Rel. Max

Rel. Min
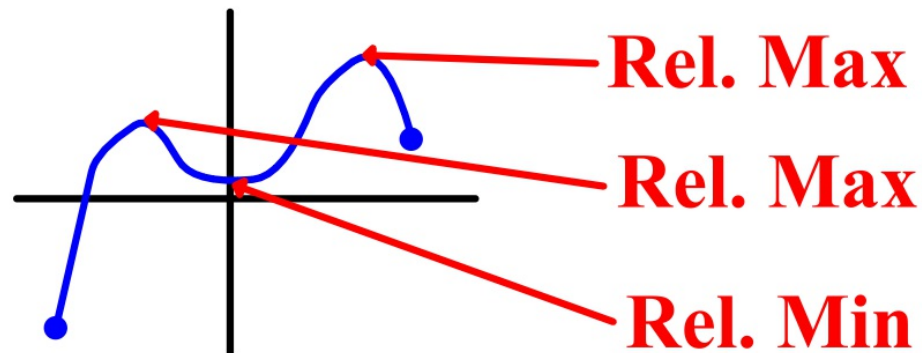
Extrema of a Function

How can we locate extrema from a function?

Extrema of a Function

Critical Numbers

Let f be defined at c. If f '$(c) = 0$ (horizontal tangent line) or if f is undefined (not differentiable) at c, then c is a critical number.

Does a critical number always represent the location of a relative max/min?

Find any critical numbers of $f(x) = -3x^3 - 2x^2 + 4x + 3$

Find any critical numbers of $g(x) = \dfrac{2x + 1}{x - 3}$

Find any critical numbers of $g(x) = 4x^3(x^2 - 1)^6$

Find any critical numbers of $f(x) = \dfrac{3x^2 + 1}{\sqrt[3]{3x - 1}}$

Find the extrema of $h(x) = (-4x^2 - 8x)^5$ on $[-2, 3]$

Find the extrema of $f(x) = -\sin(\pi x/2)$ on $[\pi/6, 7\pi/6]$

Find the extrema of $y = x^2\sqrt{x^3 - 8}$ **on the interval (2, 3]**

Homework:

p. 169# 1,2,9-12, 13-33 odd, 37, 53-58