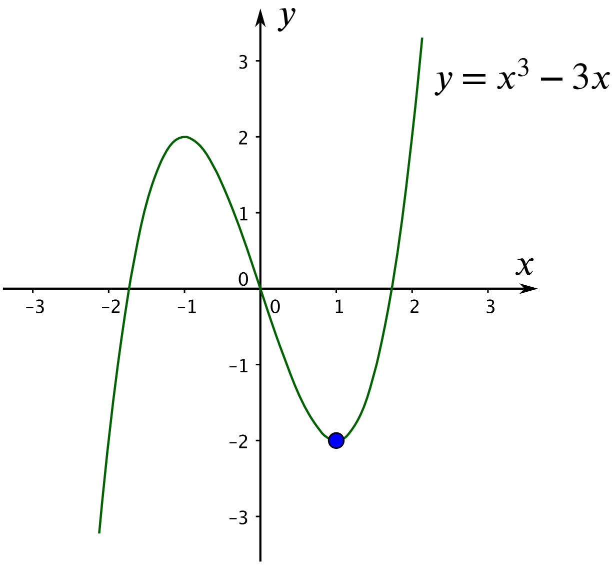
Global

A property is called *global* if it relates to the entire object of interest.

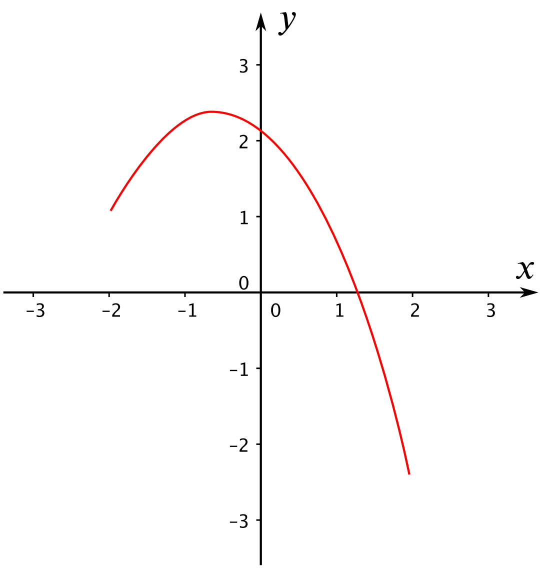
For example, the function $f(x)$ has a *global minimum* at x_0 if $f(x_0) \leq f(x)$ for *all* values of x in the the domain of the function.



Here, $f(x) = x^3 - 3x$ does not have a global minimum at $x = 1$ because there are values of x with $f(x) < f(1)$ (for example, $f(-3) = -18$ while $f(1) = -2$). However, the function does have a local minimum at $x = 1$.

If the domain of this function were restricted to $x \geq 0$, then the function would have a global minimum at $x = 1$.

A global minimum can occur at the end of the domain, even if this is not a stationary point, as in this sketch of a function with domain $[-2, 2]$, which has its global minimum at $x = 2$:



A *global maximum* is defined similarly.