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  $f(x_0) \le f(x)$  for *all* values of x in 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  $x \ge 0$ , 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.