



Why

We can interpret a real function as tracing a path as we move from left to right in its domain.¹ We want language for whether this tracing increases or decreases the range values.

Definition

Let $A \subset \mathbf{R}$ and let $f : A \rightarrow \mathbf{R}$. A function is *monotone increasing* if $f(x) < f(y)$ whenever $x < y$, and *monotone nondecreasing* if $f(x) \leq f(y)$ whenever $x, y \in \mathbf{R}$ and $x < y$.² Similarly we define *monotone decreasing* and *monotone nonincreasing*.

¹Future editions will likely have this interpretation in a separate sheet.

²Unfortunately, some authors use “monotone increasing” for “monotone nondecreasing” and use the terminology *strictly monotone increasing* for “monotone increasing”.

