



## Why

We can interpret a real function as tracing a path as we move from left to right in its domain.<sup>1</sup> 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  $x < y$ .<sup>2</sup> Similarly we define *monotone decreasing* and *monotone nonincreasing*.

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<sup>1</sup>Future editions will likely have this interpretation in a separate sheet.

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



