



## CONVEX FUNCTIONS

### Why

We generalize convex functions to  $\mathbf{R}^n$ .

### Definition

Let  $A$  be a convex subset of  $\mathbf{R}^n$ . The function  $f : A \rightarrow \mathbf{R}$  is *convex* if for any  $a, b \in A$  and  $t \in [0, 1]$ ,

$$f(ta + (1 - t)b) \leq tf(a) + (1 - t)f(b).$$

It is *concave* if  $-f$  is convex.



