



## Why

We want to talk about the size of a displacement.<sup>1</sup>

## Definition

The *norm* of a vector  $x \in \mathbf{R}^2$  is

$$\sqrt{x_1^2 + x_2^2}.$$

## Notation

We denote the norm of  $x$  by  $\|x\|$ . In other words,  $\|\cdot\| : \mathbf{R}^2 \rightarrow \mathbf{R}$  is a function from vectors in  $\mathbf{R}^2$  to real numbers. The notation follows the notation of absolute value, the *magnitude* of a real number, and the double verticals remind us that  $x$  is a vector. A warning: some authors write  $|x|$  for the norm of  $x$  when it is understood that  $x \in \mathbf{R}^2$ .

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<sup>1</sup>Future editions will complete.

Visualization





