Why

[1]

Definition

The *expectation* (or *expected value*) of a real-valued random variable defined on a probability space is its integral with respect to the probability measure. The expectation of a random variable is also called its *mean*.

Notation

Let $(X, \mathcal{A}, \mu)$ be a probability space and $f : X \to \mathsf{R}$ be a random variable. We denote the expectation of f by $\mathrm{E}\, f$. We defined it by

$$\mathrm{E}\, f = \int f d\mu.$$

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[1]Future editions will include this.