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 $\mathsf{E}f$, defined:

$$\mathsf{E}f = \int f d\mu.$$

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[1]Future editions will include this.

Expectation

Random Variables

Measurable Functions — Topological Sigma Algebra — Outcome Variables

Probability Measures — Topological Spaces

Measures — Metrics — Distance

Sigma Algebras — Extended Real Numbers

Real Limits — Space Distance

Absolute Value — Plane Distance

Event Probabilities — Interval Length

Probability Distribution — Intervals — Uncertain Outcomes

Real Line — Real Plane — Real Space

Real Summation — Real Sequences — Integral Line — Real Order — Sequences — Geometry

Real Numbers — Set Numbers

Rational Numbers — Direct Products

Natural Summation — Integer Arithmetic — Finite Sets

Subset Algebras — Family Operations — Natural Multiplicative Identity — Natural Additive Identity — Equivalent Sets

Set Operations — Algebras — Identity Elements — Arithmetic — Integer Products — Integer Sums — Cardinality — Function Inverses — Family Unions and Intersections

Operations — Natural Powers — Integer Numbers — Comparisons — Families — Function Composites — Function Images

Natural Products — Equivalence Relations — Converse Relations — Orders — Functions

Natural Sums — Relations — Natural Order

Subset Systems — Set Products — Recursion Theorem

Ordered Pairs — Set Powers — Peano Axioms

Unordered Triples — Natural Induction

Natural Numbers — Generalized Set Dualities

Set Symmetric Differences — Partitions — Intersection of Empty Set — Successor Sets — Set Dualities — Set Unions and Intersections

Set Complements — Set Intersections — Pair Unions

Set Unions — Set Differences — Pair Intersections

Unordered Pairs — Empty Set

Set Specification

Set Inclusion

Standardized Accounts

Accounts

Deductions

Quantified Statements

Logical Statements

Statements

Identities — Sets

Names

Letters — Objects