Why

We want to talk about particular attributes of an outcome, instead of the details of the outcomes themselves. These may be useful to specify events.

An *outcome variable* (or *random variable*) is a function from Ω to V, where V is a set. In this context, V is called the set of *values* of the random variable.

Example: two dice

We want to talk about the sum of the pips shown facing up after rolling two dice. We may take as our set of outcome $\{1, \ldots, 12\}$, whose elements correspond to the sum. We interpret $\{x \in \Omega \mid x \geq 10\}$ as the event that the sum of the two dice is greater than or equal to 10.

Alternatively, we may take the outcomes $\{1, \ldots, 6\}^2$ and define an outcome variable $s : \{1, \ldots, 6\}^2 \to \{1, \ldots, 12\}$ by

$$s((d_1, d_2)) = d_1 + d_2.$$

We interpret this natural-number-valued outcome variable s as sum of the two dice. The event that the sum of the two dice is greater than or equal to to 10 corresponds to the set $\{(d_1, d_2) \in \{1, \ldots, 6\} \mid s((d_1, d_2)) \geq 10\}$.

Outcome Variables

Uncertain Events

Operations

Functions

Relations

Ordered Pair Projections

Uncertain Outcomes

Set Products

Ordered Pairs

Natural Numbers

Set Powers

Intersection of Empty Set

Successor Sets

Unordered Triples

Set Intersections

Set Symmetric Differences

Pair Unions

Pair Intersections

Set Complements

Set Unions

Set Differences

Empty Set

Unordered Pairs

Set Specification

Set Equality

Set Inclusion

Deductions

Quantified Statements

Logical Statements

Statements

Identities

Sets

Names

Letters

Objects

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