



## 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  $\Omega$  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  $\{1, \dots, 12\}$ , 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  $\{1, \dots, 6\}^2$  and define an outcome variable  $s : \{1, \dots, 6\}^2 \rightarrow \{1, \dots, 12\}$  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 10 corresponds to the set  $\{(d_1, d_2) \in \{1, \dots, 6\} \mid s((d_1, d_2)) \geq 10\}$ .



