

Probability

event space $\Omega = \{ \text{set of all possible events} \}$.

ex flipping a coin $\Omega = \{H, T\}$

ex rolling 2 dice and looking at their sum
 $\Omega = \{2, 3, 4, \dots, 12\}$

note: don't assume all events are equally.

Def a probability measure: a function that assigns a # between 0 and 1 to every event.

$$P(\text{rolling a 7}) = \frac{6}{36}$$

$$P(\text{rolling 13}) = 0$$

$$P(\text{rolling a number less than 12}) = \frac{35}{36}$$

ex Let. $\Omega = \{1, 2, 3, 4, 5, 6\}$.
 let all events be equally likely.

$$P(X=1) = \frac{1}{6}, \quad P(X \leq 2) = \frac{2}{6} = \frac{1}{3}$$

when all events are equally likely.

$$P(\text{event } A) = \frac{\# \text{ of ways } A \text{ can happen}}{\# \text{ of total events.}}$$

$$P(\text{rolling an even or a prime or 1 die.}) = \frac{5}{6}$$

$$\begin{aligned} P(\text{rolling an even or a prime on 2 dice}) &= \\ &= P(\text{roll an even}) + P(\text{rolling a prime}) - P(\text{rolling a 6}) \\ &= 1 - P(\text{rolling a 9}) \\ &= 1 - \frac{4}{36} = \frac{8}{9} \end{aligned}$$

