- Experiment : Rolling a six-face dice.
  6 possible outcomes : $\{1,2,3,4,5,6\}$ → sample space
  Subset of sample space $\{1,3,5\}$ called events.

- Given the sample space S of an experiment, probability of an event $E \subseteq S$ is $P(E)$
  where impossible events are probability 0,
  certain events are probability 1
  → $P(\emptyset) = 0$
  $P(S) = 1$

- Calculating P for event $E \subseteq$ sample space S

$$P(E) = \frac{|E|}{|S|} = \frac{\text{Num. in events}}{\text{Num. in sample space}}$$

- If events are mutually exclusive i.e. $E_1 \cap E_2 = \emptyset$

$$P(E_1 \cup E_2) = P(E_1) + P(E_2)$$

- Ex: Two dice are rolled. P of each sum?
  $|E| = 6 \times 6 = 36$
  1 way of 2 $(1+1)$ → $P(2) = \frac{1}{36}$

  2 way of 3 $(1+2,\ 2+1)$ → $P(3) = \frac{2}{36}$
  ...

  1 way of 12 $(6+6)$ → $P(12) = \frac{1}{36}$

⊛ Misconceptions: Gambler's fallacy

If events are independent, results are independent

E.g. After getting 5 tails in a row,

$P(\text{tail})$ is $\frac{1}{2}$, not less.