

Roll one die

- We take a (fair, 6-sided) die: $\Omega = \{1, 2, 3, 4, 5, 6\}$
- for all $\omega \in \Omega$, $p(\omega) = 1/6$.
- Probability to “roll a 5” = $\mathbb{P}(\{5\}) = 1/6$;
- Probability to “roll an even number” = $\mathbb{P}(\{2, 4, 6\}) = 3/6 = 1/2$.

- Note that the assumption that $p(\omega) = 1/6$ for all ω is the assumption that the die is “fair”
- In contrast, we could have a weighted die where 1 is twice as likely to come up as the other numbers, and we would have

$$p(1) = 2/7, \quad p(2) = p(3) = p(4) = p(5) = p(6) = 1/7.$$

- In that case, Probability of even is

$$\mathbb{P}(\{2, 4, 6\}) = 3/7.$$