Another example

- Roll ten dice, add up total, call it X. What is $\mathbb{E}[X]$?
- We **could** enumerate the 6^{10} terms in the outcome space, etc., etc.... OR
- Let $X_1, X_2, \ldots, X_{10}$ each be distributed uniformly on $\{1, 2, 3, 4, 5, 6\}$.
- Let $X = X_1 + X_2 + \cdots + X_{10}$, then

$$\begin{aligned}\mathbb{E}[X] &= \mathbb{E}[X_1 + X_2 + \cdots + X_{10}] \\ &= \mathbb{E}[X_1] + \mathbb{E}[X_2] + \cdots + \mathbb{E}[X_{10}] \\ &= 10\mathbb{E}[X_1] = 10 * \frac{7}{2} = 35.\end{aligned}$$