

Roll 10 dice

- Let X_1, \dots, X_{10} represent the independent rolls of six-sided dice, and let X be the sum.
- We know that $\mathbb{E}[X] = 10 * (7/2) = 35$.
- What is $\mathbb{P}(X = 35)$?
- We have

$$G_{X_i}(t) = \frac{1}{6}(t + t^2 + t^3 + t^4 + t^5 + t^6),$$

so

$$G_X(t) = \frac{1}{6^{10}}(t + t^2 + t^3 + t^4 + t^5 + t^6)^{10}$$

- So $\mathbb{P}(X = 35)$ is the coefficient of t^{35} in the polynomial above.