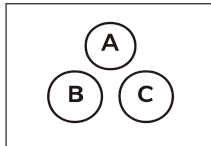


24 Discrete Distribution Hyper-geometric

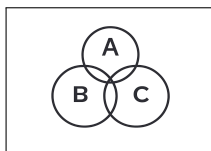


$$N = 5$$

$$K = 2$$

$$n = 2$$

$$k = 1$$

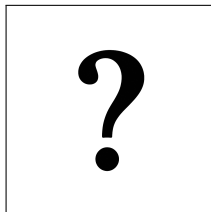


$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X = 1) = \frac{\binom{2}{1} \binom{3}{1}}{\binom{5}{2}} = \frac{2 \times 3}{10} = \frac{6}{10} = \boxed{0.6}$$

$$E[X] = n \frac{K}{N}$$

$$\text{Var}(X) = n \frac{K}{N} \left(1 - \frac{K}{N}\right) \frac{N-n}{N-1}$$



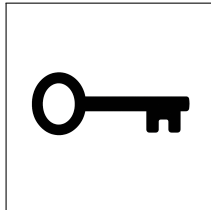
$$N = 10$$

$$K = 7$$

$$n = 4$$

$$P(X \leq 1) = ?$$

24 Discrete Distribution Hyper-geometric



$$\begin{aligned}N &= 10 \\K &= 7 \\n &= 4 \\P(X \leq 1) &= ?\end{aligned}$$

$$P(X = k) = \frac{\binom{K}{k} \binom{N-K}{n-k}}{\binom{N}{n}}$$

$$P(X \leq 1) = P(X = 0) + P(X = 1)$$

$$P(X = 0) \binom{3}{4} = 0 \Rightarrow P(X = 0) = 0$$

$$P(X = 1) = \frac{\binom{7}{1} \binom{3}{3}}{\binom{10}{4}} = \frac{7 \times 1}{210} = \frac{7}{210} = \frac{1}{30}$$

$$P(X \leq 1) = 0 + \frac{1}{30} = \frac{1}{30} \approx \boxed{0.0333}$$