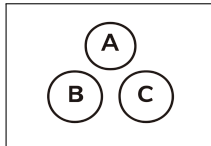
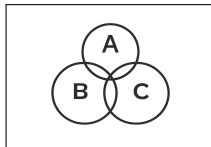


20 Discrete Distribution Exp Value / Variance

C



$$n = 6$$
$$p = \frac{1}{2}$$



$$E[X] = np = 6 \cdot \frac{1}{2} = \boxed{3}$$

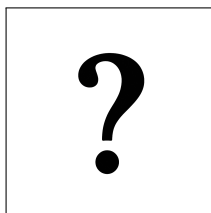
$$\text{Var}(X) = np(1 - p) = 3 \cdot \frac{1}{2} = \boxed{\frac{3}{2}}$$

$$E[X^2] = \text{Var}(X) + (E[X])^2$$

$$E[X^2] = \frac{3}{2} + 3^2$$

$$E[X^2] = \frac{3}{2} + 9$$

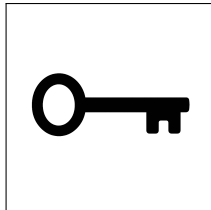
$$E[X^2] = \boxed{\frac{21}{2}}$$



$$n = 5$$
$$p = 0.4$$
$$PMF = ?$$

20 Discrete Distribution Exp Value / Variance

C



$$\begin{aligned}n &= 5 \\p &= 0.4 \\PMF &= ?\end{aligned}$$

PMF

$$P(X = x) = \binom{5}{x} (0.4)^x (0.6)^{5-x}$$

$$P(X = 0) = \binom{5}{0} (0.4)^0 (0.6)^5 = 0.6^5 \approx 0.0778$$

$$P(X = 1) = \binom{5}{1} (0.4)^1 (0.6)^4 = 5 \cdot 0.4 \cdot 0.6^4 \approx 0.2592$$

$$P(X = 2) = \binom{5}{2} (0.4)^2 (0.6)^3 = 10 \cdot 0.16 \cdot 0.216 \approx 0.3456$$

$$P(X = 3) = \binom{5}{3} (0.4)^3 (0.6)^2 = 10 \cdot 0.064 \cdot 0.36 \approx 0.2304$$

$$P(X = 4) = \binom{5}{4} (0.4)^4 (0.6)^1 = 5 \cdot 0.0256 \cdot 0.6 \approx 0.0768$$

$$P(X = 5) = \binom{5}{5} (0.4)^5 (0.6)^0 = 0.4^5 = 0.0102$$

$$\mu = E[X] = np = 5 \times 0.4 = \boxed{2.0}$$

$$\text{Var}(X) = np(1 - p) = 5 \times 0.4 \times 0.6 = \boxed{1.2}$$

$$\sigma = \sqrt{\text{Var}(X)} = \sqrt{1.2} \approx \boxed{1.0954}$$