

14

Discrete Distribution PMF

D



$$P_0 = P_1 = P_2 = 1/4$$

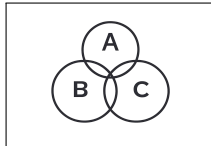
$$X : \Omega \rightarrow \mathbb{R}$$

$$X(1, 1) = 1 + 1 = 2 = \Omega_2$$

$$X(1, 0) = 1 + 0 = 1 = \Omega_1$$

$$X(0, 1) = 0 + 1 = 1 = \Omega_1$$

$$X(0, 0) = 0 + 0 = 0 = \Omega_0$$



PMF

$$P(X = 0) = |\Omega_0| \times P_0 = 1 \times 1/4 = 1/4$$

$$P(X = 1) = |\Omega_1| \times P_1 = 2 \times 1/4 = 1/2$$

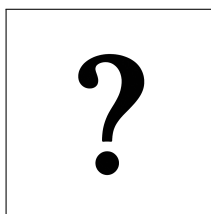
$$P(X = 2) = |\Omega_2| \times P_2 = 1 \times 1/4 = 1/4$$

CDF

$$F(X = 0) = P(X = 0) = 1/4$$

$$F(X = 1) = P(X = 0) + P(X = 1) = 3/4$$

$$F(X = 2) = P(X = 0) + P(X = 1) + P(X = 2) = 1$$



$$P(X = k) = \frac{\binom{3}{k} \binom{12}{3-k}}{\binom{15}{3}}, \quad k = 0, 1, 2, 3$$

$$PMF = ?$$

$$CDF = ?$$

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$$P(X = k) = \frac{\binom{3}{k} \binom{12}{3-k}}{\binom{15}{3}}, \quad k = 0, 1, 2, 3$$

PMF

$$P(X = 0) = \frac{\binom{3}{0} \binom{12}{3}}{455} = \frac{1 \cdot 220}{455} = \frac{220}{455}$$

$$P(X = 1) = \frac{\binom{3}{1} \binom{12}{2}}{455} = \frac{3 \cdot 66}{455} = \frac{198}{455}$$

$$P(X = 2) = \frac{\binom{3}{2} \binom{12}{1}}{455} = \frac{3 \cdot 12}{455} = \frac{36}{455}$$

$$P(X = 3) = \frac{\binom{3}{3} \binom{12}{0}}{455} = \frac{1 \cdot 1}{455} = \frac{1}{455}$$

CDF

$$F(X = 0) = \frac{220}{455}$$

$$F(X = 1) = \frac{220+198}{455} = \frac{418}{455}$$

$$F(X = 2) = \frac{418+36}{455} = \frac{454}{455}$$

$$F(X = 3) = 1$$