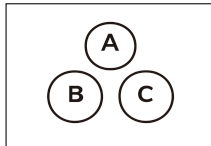


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Discrete Distribution CDF

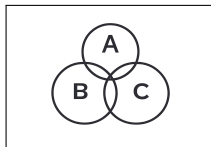
E



$$N = 5$$

$$K = 3$$

$$n = 2$$



$$P(X = k) = \binom{3}{k} \binom{2}{2-k} / \binom{5}{2} = \binom{3}{k} \binom{2}{2-k} / 10$$

$$P(X = 0) = \binom{3}{0} \binom{2}{2} / 10 = 1/10 = 0.10$$

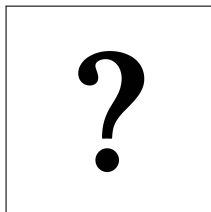
$$P(X = 1) = \binom{3}{1} \binom{2}{1} / 10 = 6/10 = 0.60$$

$$P(X = 2) = \binom{3}{2} \binom{2}{0} / 10 = 3/10 = 0.30$$

$$F(0) = 0.10$$

$$F(1) = 0.10 + 0.60 = 0.70$$

$$F(2) = 1$$



PMF

$$P(X = -4) = 0.3$$

$$P(X = 1) = 0.4$$

$$P(X = 4) = 0.3$$

$$E[X] = ?$$

$$E[X^2] = ?$$

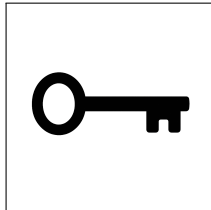
$$\text{Var}(X) = ?$$

$$\sigma_X = ?$$

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Discrete Distribution
CDF

E

*PMF*

$$P(X = -4) = 0.3$$

$$P(X = 1) = 0.4$$

$$P(X = 4) = 0.3$$

$$E[X] = ?$$

$$E[X^2] = ?$$

$$\text{Var}(X) = ?$$

$$\sigma_X = ?$$

$$E[X] = (-4) \cdot 0.3 + 1 \cdot 0.4 + 4 \cdot 0.3$$

$$E[X] = -1.2 + 0.4 + 1.2$$

$$E[X] = \boxed{0.4}$$

$$E[X^2] = (-4)^2 \cdot 0.3 + 1^2 \cdot 0.4 + 4^2 \cdot 0.3$$

$$E[X^2] = 16 \cdot 0.3 + 1 \cdot 0.4 + 16 \cdot 0.3$$

$$E[X^2] = 4.8 + 0.4 + 4.8$$

$$E[X^2] = \boxed{10.0}$$

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

$$\text{Var}(X) = 10.0 - (0.4)^2$$

$$\text{Var}(X) = 10.0 - 0.16$$

$$\text{Var}(X) = \boxed{9.84}$$

$$\sigma_X = \sqrt{\text{Var}(X)} = \sqrt{9.84} \approx \boxed{3.136}$$