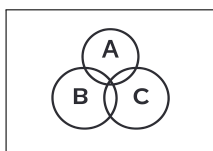
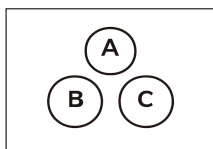


18

Discrete Distribution Uniform Variable

G

$$X = \{2, 4, 6, 8\}$$



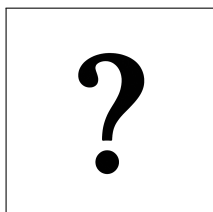
$$P(X = x) = \frac{1}{4}$$

$$E(X) = \sum_x xP(X = x) = \frac{1}{4}(2 + 4 + 6 + 8) = \frac{20}{4} = 5$$

$$E(X^2) = \sum_x x^2P(X = x) = \frac{1}{4}(2^2 + 4^2 + 6^2 + 8^2) = \frac{1}{4}(4 + 16 + 36 + 64) = \frac{120}{4} = 30$$

$$\text{Var}(X) = E(X^2) - [E(X)]^2 = 30 - 25 = 5$$

$$E(3X - 1) = 3E(X) - 1 = 3(5) - 1 = 14$$



$$X = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\} \rightarrow |X| = 10$$

$$E[X] = ?$$

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

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

18

Discrete Distribution
Uniform Variable

G



$$X = \{0, 1, 2, 3, 4, 5, 6, 7, 8, 9\} \rightarrow |X| = 10$$

$$E[X] = ?$$

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

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

$$E[X] = \frac{0+1+2+3+4+5+6+7+8+9}{10} = \frac{45}{10} = 4.5$$

$$E[X^2] = \frac{0^2+1^2+\dots+9^2}{10} = \frac{285}{10} = 28.5$$

$$\text{Var}(X) = \frac{|X|^2-1}{12} = \frac{10^2-1}{12} \quad \text{Var}(X) = \frac{99}{12} = 8.25$$

$$\text{Var}(X) = E[X^2] - (E[X])^2 = 28.5 - (4.5)^2 = 28.5 - 20.25 = 8.25$$