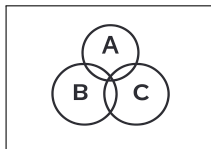
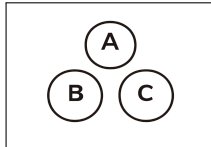


18

Discrete Distribution Uniform Variable

J

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



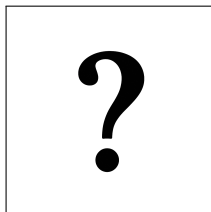
$$P(X = x) = \frac{1}{4}$$

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

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

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

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



$$X = \{1, 2, \dots, 10\}$$

$$Y = 5X + 3$$

$$E[X] = ?$$

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

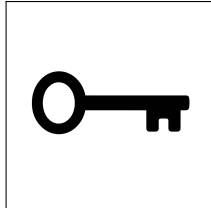
$$E[Y] = ?$$

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

18

Discrete Distribution
Uniform Variable

J



$$X = \{1, 2, \dots, 10\}$$

$$Y = 5X + 3$$

$$E[X] = ?$$

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

$$E[Y] = ?$$

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

$$E[X] = \frac{1+10}{2} = 5.5$$

$$E[Y] = 5E[X] + 3$$

$$E[Y] = 5 \cdot 5.5 + 3 = 27.5 + 3 = 30.5$$

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

$$\text{Var}(Y) = 5^2 \text{Var}(X) = 25 \text{Var}(X)$$

$$\text{Var}(Y) = 25 \cdot 8.25 = 206.25$$