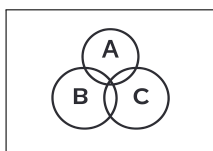
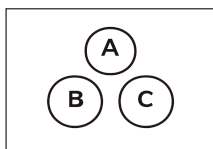


18

Discrete Distribution Uniform Variable

D

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



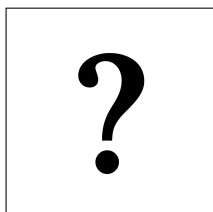
$$P(X = x) = \frac{1}{4}$$

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

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

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

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



$$X = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21\}$$

$$X = \{a, 3, 5, 7, 9, 11, 13, 15, 17, 19, b\}$$

$$a = 1$$

$$b = 21$$

$$d = 2$$

$$N = \frac{b-a}{d} + 1 = \frac{21-1}{2} + 1 = 10 + 1 = 11$$

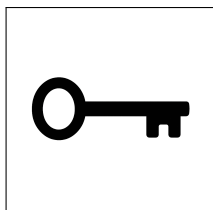
$$E[X] = ?$$

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

18

Discrete Distribution Uniform Variable

D



$$X = \{1, 3, 5, 7, 9, 11, 13, 15, 17, 19, 21\}$$

$$X = \{a, 3, 5, 7, 9, 11, 13, 15, 17, 19, b\}$$

$$a = 1$$

$$b = 21$$

$$d = 2$$

$$N = \frac{b-a}{d} + 1 = \frac{21-1}{2} + 1 = 10 + 1 = 11$$

$$E[X] = ?$$

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

$$E[X] = \frac{a+b}{2} = \frac{1+21}{2} = 11$$

$$\text{Var}(X) = \frac{(N^2-1)d^2}{12}$$

$$\text{Var}(X) = \frac{(11^2-1) \cdot 2^2}{12}$$

$$\text{Var}(X) = \frac{(121-1) \cdot 4}{12}$$

$$\text{Var}(X) = \frac{120 \cdot 4}{12}$$

$$\text{Var}(X) = 40$$