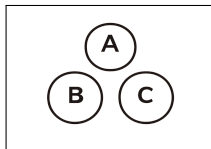


17

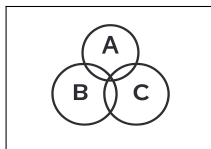
Discrete Distribution Standard Deviation

A



$$X = \{1, 2, 3, 4, 5, 6\}$$

$$P(X = x) = \frac{1}{6}$$



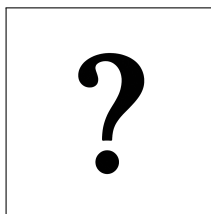
$$E(X) = \sum_{x=1}^6 x \cdot \frac{1}{6} = \frac{1+2+3+4+5+6}{6} = \frac{21}{6} = 3.5$$

$$E(X^2) = \sum_{x=1}^6 x^2 \cdot \frac{1}{6} = \frac{1^2+2^2+3^2+4^2+5^2+6^2}{6} = \frac{91}{6}$$

$$\begin{aligned} \text{Var}(X) &= E(X^2) - [E(X)]^2 = \frac{91}{6} - (3.5)^2 = \frac{91}{6} - \frac{49}{4} = \\ &= \frac{182-147}{12} = \frac{35}{12} = \frac{35}{12} \end{aligned}$$

$$\text{SD}(X) = \sqrt{\text{Var}(X)} = \sqrt{\frac{35}{12}} = \sqrt{\frac{35}{12}} \approx 1.708$$

$$\text{Var}(4X + 2) = 16 \text{Var}(X)$$



$$P(X = 20) = 0.15$$

$$P(X = 30) = 0.10$$

$$P(X = 40) = 0.05$$

$$P(X = 50) = 0.20$$

$$P(X = 60) = 0.10$$

$$P(X = 70) = 0.10$$

$$P(X = 80) = 0.30$$

$$E(X^2) = ?$$

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

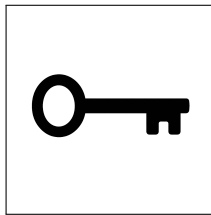
$$\sigma = ?$$

$$(\mu - \sigma) \geq X \leq (\mu + \sigma) \rightarrow X = ?$$

17

Discrete Distribution
Standard Deviation

A



$$P(X = 20) = 0.15$$

$$P(X = 30) = 0.10$$

$$P(X = 40) = 0.05$$

$$P(X = 50) = 0.20$$

$$P(X = 60) = 0.10$$

$$P(X = 70) = 0.10$$

$$P(X = 80) = 0.30$$

$$E(X^2) = ?$$

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

$$\sigma = ?$$

$$(\mu - \sigma) \geq X \leq (\mu + \sigma) \rightarrow X = ?$$

$$E(X^2) = \sum x^2 p(x) = 20^2(0.15) + 30^2(0.10) + \dots + 80^2(0.30) = 3935$$

$$\text{Var}(X) = E(X^2) - \mu^2 = 3935 - 55^2 = 475$$

$$\sigma = \sqrt{475} \approx 21.7945$$

$$P = (\mu - \sigma) \geq X \leq (\mu + \sigma)$$

$$P = (55 - 21.79)/(55 + 21.79) \approx 33.21/76.79$$

$$P = 0.05 + 0.20 + 0.10 + 0.10 = 0.45$$