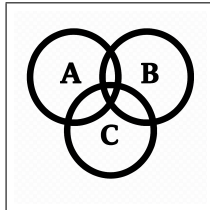




# Uniform Variable



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



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

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

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

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

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



$$X = \{-3, -1, 1, 3\}$$

$$Y = 2X + 10$$

$$E(Y^2) = E[(2X + 10)^2] = ?$$



## Uniform Variable



$$\begin{aligned}X &= \{-3, -1, 1, 3\} \\Y &= 2X + 10 \\E(Y^2) &= E[(2X + 10)^2] = ?\end{aligned}$$

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$$\begin{aligned}(2X + 10)^2 &= 4X^2 + 40X + 100 \\E[(2X + 10)^2] &= 4E(X^2) + 40E(X) + 100 \\E(X) &= \frac{-3+(-1)+1+3}{4} = \frac{0}{4} = 0 \\X^2 &= \{9, 1, 1, 9\} \\E(X^2) &= \frac{9+1+1+9}{4} = \frac{20}{4} = 5 \\E[(2X + 10)^2] &= 4(5) + 40(0) + 100 = 20 + 0 + 100 = \boxed{120}\end{aligned}$$