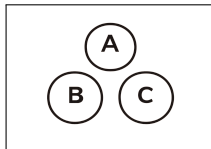


16 Discrete Distribution Expected Value Function

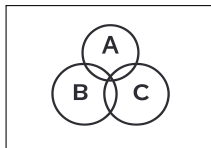
E



$$Y = 20 - 2X$$

$$E(X) = 6$$

$$E(Y) = ?$$

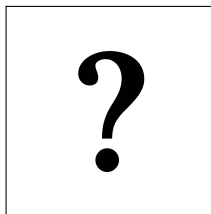


$$E(Y) = E(20 - 2X)$$

$$E(20 - 2X) = E(20) - 2E(X)$$

$$E(20) = 20$$

$$E(Y) = 20 - 2(6) = 20 - 12 = 8$$



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

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

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

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

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

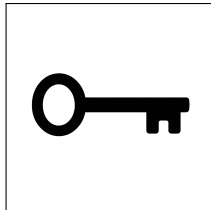
$$P(X = 70) = 0.10$$

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

$$E(X^2) - [E(X)]^2 = ?$$

16 Discrete Distribution Expected Value Function

E



$$\begin{aligned}P(X = 20) &= 0.15 \\P(X = 30) &= 0.10 \\P(X = 40) &= 0.05 \\P(X = 50) &= 0.20 \\P(X = 60) &= 0.10 \\P(X = 70) &= 0.10 \\P(X = 80) &= 0.30 \\E(X^2) - [E(X)]^2 &= ?\end{aligned}$$

$$\begin{aligned}E(X) &= \sum x \cdot p(x) \\E(X) &= 20(0.15) + 30(0.10) + 40(0.05) + 50(0.20) + \\& 60(0.10) + 70(0.10) + 80(0.30) \\E(X) &= 3 + 3 + 2 + 10 + 6 + 7 + 24 = \boxed{55}\end{aligned}$$

$$\begin{aligned}E(X^2) &= \sum x^2 \cdot p(x) \\E(X^2) &= 20^2(0.15) + 30^2(0.10) + 40^2(0.05) + 50^2(0.20) + \\& 60^2(0.10) + 70^2(0.10) + 80^2(0.30) \\E(X^2) &= 400(0.15) + 900(0.10) + 1600(0.05) + 2500(0.20) + \\& 3600(0.10) + 4900(0.10) + 6400(0.30) \\E(X^2) &= 60 + 90 + 80 + 500 + 360 + 490 + 1920 = \boxed{3500}\end{aligned}$$

$$E(X^2) - (E(X))^2 = 3500 - 55^2 = 3500 - 3025 = \boxed{475}$$