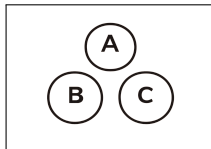


16 Discrete Distribution Expected Value Function

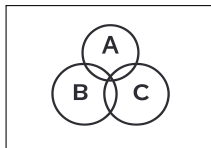
F



$$Y = 20 - 2X$$

$$E(X) = 6$$

$$E(Y) = ?$$

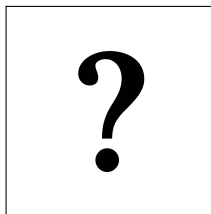


$$E(Y) = E(20 - 2X)$$

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

$$E(20) = 20$$

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



$$x = \{-2, -1, 0, 1, 2\}$$

$$p(x) = c(x - 3)^2$$

$$c = ?$$

$$E(X) = ?$$

16 Discrete Distribution Expected Value Function

F



$$x = \{-2, -1, 0, 1, 2\}$$

$$p(x) = c(x - 3)^2$$

$$c = ?$$

$$E(X) = ?$$

$$\sum p(x) = \sum_{x=-2}^2 c(x - 3)^2 = 1 \Rightarrow c \sum_{x=-2}^2 (x - 3)^2 = 1$$

$$(-2 - 3)^2 = 25$$

$$(-1 - 3)^2 = 16$$

$$(0 - 3)^2 = 9$$

$$(1 - 3)^2 = 4$$

$$(2 - 3)^2 = 1$$

$$25 + 16 + 9 + 4 + 1 = 55$$

$$c \cdot 55 = 1 \Rightarrow c = \boxed{\frac{1}{55}}$$

$$P(X = -2) = \frac{(-2-3)^2}{55} = 25/55$$

$$P(X = -1) = \frac{(-1-3)^2}{55} = 16/55$$

$$P(X = 0) = \frac{(0-3)^2}{55} = 9/55$$

$$P(X = 1) = \frac{(1-3)^2}{55} = 4/55$$

$$P(X = 2) = \frac{(2-3)^2}{55} = 1/55$$

$$E(X) = \sum x \cdot p(x) = \frac{-50-16+0+4+2}{55} = \frac{-60}{55} = \boxed{-\frac{12}{11}}$$