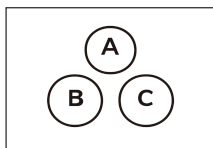


22

Discrete Distribution Geometric Variable

E

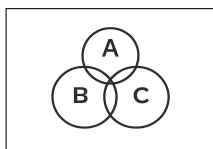


$$p = 0.25$$

$$X = \{1, 2, 3, \dots\}$$

$$PMF = ?$$

$$E[X] = ?$$



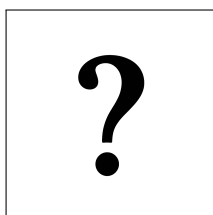
$$P(X = x) = (1 - p)^{x-1}p$$

$$P(X = 1) = 0.25$$

$$P(X = 2) = 0.75(0.25) = 0.1875$$

$$P(X = 3) = 0.75^2(0.25) = 0.1406$$

$$E[X] = 1/p = 1/0.25 = \boxed{4}$$



$$p = \frac{2}{6} = \frac{1}{3}$$

$$q = 1 - p = 2/3$$

$$X = \{1, 2, 3, \dots\}$$

$$P(X = 3) = ?$$

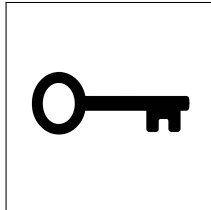
$$P(X = 50) = ?$$

$$E[X] = ?$$

22

Discrete Distribution
Geometric Variable

E



$$p = \frac{2}{6} = \frac{1}{3}$$

$$q = 1 - p = 2/3$$

$$X = \{1, 2, 3, \dots\}$$

$$P(X = 3) = ?$$

$$P(X = 50) = (2/3)^{49} (1/3) = ?$$

$$E[X] = ?$$

$$P(X = k) = (1 - p)^{k-1} p = \left(\frac{2}{3}\right)^{k-1} \left(\frac{1}{3}\right)$$

$$P(X = 3) = \left(\frac{2}{3}\right)^2 \left(\frac{1}{3}\right) = \frac{4}{9} \cdot \frac{1}{3} = \boxed{\frac{4}{27}}$$

$$P(X = 50) = \boxed{\left(\frac{2}{3}\right)^{49} \left(\frac{1}{3}\right)}$$

$$E[X] = \frac{1}{p} = \frac{1}{1/3} = \boxed{3}$$