

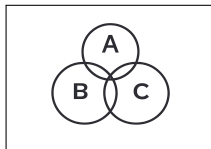
21

Discrete Distribution Poisson Variable

T

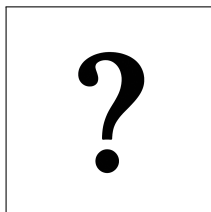


$$\lambda = 1$$



$$P(X = k) = e^{-\lambda} \frac{\lambda^k}{k!}$$

$$P(X = 0) = e^{-1} \frac{1^0}{0!} = e^{-1} \approx \boxed{0.37}$$



$$n = 100$$

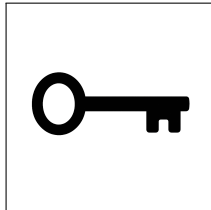
$$p = 0.05$$

$$P(X \geq 2) = ?$$

21

Discrete Distribution
Poisson Variable

T



$$\begin{aligned}n &= 100 \\p &= 0.05 \\P(X \geq 2) &= ?\end{aligned}$$

$$\begin{aligned}\lambda &= np = 100 \times 0.05 = 5 \\X &\sim \text{Pois}(5)\end{aligned}$$

$$P(X \geq 2) = 1 - [P(X = 0) + P(X = 1)]$$

$$P(X \geq 2) = 1 - \left(e^{-5} \frac{5^0}{0!} + e^{-5} \frac{5^1}{1!} \right)$$

$$P(X \geq 2) = 1 - e^{-5}(1 + 5)$$

$$P(X \geq 2) = 1 - 6e^{-5}.$$

$$P(X \geq 2) \approx 1 - 6 \times 0.0067379 = 1 - 0.0404274 \approx \boxed{0.9596}$$