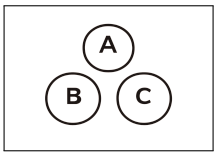
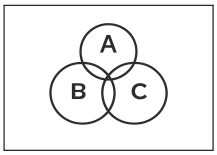
21 Discrete Distribution Poisson Variable D



$\lambda = 1$



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

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

$\lambda = 3$

$P(X \geq 3) = ?$

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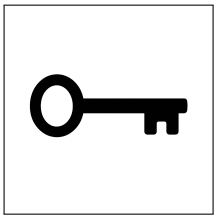

$\lambda = 3$
$P(X \geq 3) = ?$

$P(X \geq 3) = 1 - [P(X = 0) + P(X = 1) + P(X = 2)] = 1 - \sum_{k=0}^{2} e^{-3} \frac{3^k}{k!}$

$P(X = 0) = e^{-3}$

$P(X = 1) = 3e^{-3}$

$P(X = 2) = \frac{3^2}{2!} e^{-3} = 4.5\, e^{-3}$

$\sum_{k=0}^{2} P(X = k) = (1 + 3 + 4.5)\, e^{-3} = 8.5\, e^{-3}$

$P(X \geq 3) = 1 - 8.5\, e^{-3} \approx 1 - 8.5 \times 0.0497871 \approx \boxed{0.5768}$