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No

You may leave your answers in combinatorial form or in exponential form.

1. (10 points) The average number of EF3-EF5 tornadoes that hit Tennessee every year is 2.7. What is the probability that fewer than two tornadoes occur in Tennessee next year? What is the name of the distribution you used (e.g., binomial, Poisson or hypergeometric)?

X: number of EF3-EF5 $f(x, \lambda) = \frac{e^{-\lambda} \lambda^x}{x!}$

$$P(X < 2) = P(0) + P(1) = \frac{e^{-2.7} (2.7)^0}{0!} + \frac{e^{-2.7} (2.7)^1}{1!}$$

$$P(X < 2) = 0.249$$

2. (10 points) Twelve percent of computer components produced by a certain supplier are defective. What is the probability that a random sample of 12 components contains 2 or more defectives? What is the name of the distribution of the number of defectives per box (e.g., binomial, Poisson or hypergeometric)?

X: number of defective component

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

$$b = \binom{n}{x} p^x (1-p)^{n-x}$$

$n = 12$

$$P(X \geq 2) = 1 - [{}_{12}C_0 (.12)^0 (.88)^{12} + {}_{12}C_1 (.12)^1 (.88)^{11}]$$

3. (10 points) Computer components of an identical type are shipped in lots of 100. Sixteen of the components have defects. What is the probability that 10 components sampled without replacement yield exactly one defective? What is the name of the distribution you used (e.g., binomial, Poisson or hypergeometric)?

$$\begin{aligned} N &= 100 \\ n &= 16 \\ r &= 10 \\ k &= 1 \end{aligned}$$

$$h = \frac{\binom{n}{k} \binom{N-n}{r-k}}{\binom{N}{r}}$$

$$P(X=1) = \frac{{}_{16}C_1 {}_{100-16}C_{10-1}}{{}_{100}C_{10}}$$

a
x

$$P(X=1) = \frac{({}_{16}C_1)({}_{84}C_9)}{{}_{100}C_{10}}$$