

M360
Elements of Probability; Assignment 7

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Section 2.4, #s 4,5

Question 1. *If X has a Poisson distribution so that $3P(X = 1) = P(X = 2)$. Find $P(X = 4)$.*

Solution: Note that $f(x) = \lambda^x e^{-\lambda}/x!$, $x \in \mathbb{N}$. So $3\lambda e^{-\lambda}/x! = \lambda^2 e^{-\lambda}/2 \Rightarrow \lambda = 0$ or $\lambda = 6$. Clearly $\lambda = 0$ is extraneous. So $\lambda = 6$. So

$$f(4) = 6^4 e^{-6}/4! = 0.134$$

□

Question 2. *Flaws in certain type of drapery material appear on the average of one in 150 square feet. If we assume the Poisson distribution, find the probability of at most one flaw in 225 square feet.*

Solution: We have $\lambda = 1/50$, and $t = 225$. So we want $\sum_{x=0}^1 (1.5)^x e^{1.5}/x! = 0.558$

□