University of Texas at Austin

Quiz #15

The loss elimination ratio. Poisson.

Please, provide your **complete solutions** to the following questions:

Problem 15.1. (6 points) Losses have an exponential distribution with a mean of 1,000. There is a deductible of 500. Determine the amount by which the deductible should be raised in order to double the loss elimination ratio.

Problem 15.2. (2 pts) The Poisson distribution has the memoryless property. *True or false? Why?*

Problem 15.3. (2 pts) Let $N_1, N_2, \ldots, N_\ell$ be independent, Poisson random variables with respecive parameters $\lambda_1, \lambda_2, \ldots, \lambda_\ell$. Then, the random variable $N := N_1 + N_2 + \cdots + N_\ell$ is also Poisson with the parameter $\lambda = \max(\lambda_1, \lambda_2, \ldots, \lambda_\ell)$. *True or false? Why?*

Problem 15.4. (5 points) *Source: Prof. Jim Daniel, personal communication.*
Let the number of car accidents in a calendar year by a group of drivers be denoted by N and modeled using the Poisson distribution with mean 10.
Assume that the probability that the damage in any single accident is at most \$1,000 equals 2/5.
The number of accidents and the damages caused are assumed to be independent.
Find the probability that the number of accidents in one year with damage greater than \$1000 is 5, given that the number of accidents in that year with damage at most \$1000 equals 100.