Class Problems, Lecture 13

Problem 1

Let $X_1, X_2, X_3, \ldots, X_k$ and Y all be independent exponentially distributed random variables with mean 1. Find

$$\Pr(Y \geq \sum_{i=1}^{k} X_i).$$

You may want to start with $k = 2$.

Problem 2

Suppose I have a box with n batteries. Each battery has a lifetime that is independently exponentially distributed with mean μ. My Xbox remote requires two batteries; when one battery dies, I replace it with one from the box, but keep the battery that is still going. What is the probability that the ith battery I use in the Xbox is the last live battery?

Problem 3

Do you see a relationship between these problems?