Problem 1
I roll a six-sided die and observe the number $N$ on the uppermost face. I then toss a fair coin $N$ times and observe $X$, the total number of heads to appear. What is the probability that $N = 3$ and $X = 1$? What is the probability that $X = 4$?

Problem 2
A nickel is tossed 20 times in succession. Every time that the nickel comes up heads, a dime is tossed. Let $X$ count the number of heads appearing on tosses of the dime. Determine $P(X = 0)$.

Problem 3
The number of accidents occurring in a factory in a week is a Poisson random variable with mean 1. The number of individuals injured in different accidents is independently distributed, each with mean 3 and variance 4. Determine the mean and variance of the number of individuals injured in a week.