

1. Let X_1, X_2, \dots, X_n be n mutually independent random variables, each of which is uniformly distributed on the integers from 1 to k . Let Y denote the minimum of the X_i 's. Find the distribution of Y .
2. Your organization owns a copier (future lawyers, etc.) or MRI (future doctors). This machine has a manufacturer's expected lifetime of 10 years. This means that we expect one failure every ten years. (Include the probability statements and R Code for each part.).
 - a. What is the probability that the machine will fail after 8 years?. Provide also the expected value and standard deviation. Model as a geometric. (Hint: the probability is equivalent to not failing during the first 8 years..)
 - b. What is the probability that the machine will fail after 8 years?. Provide also the expected value and standard deviation. Model as an exponential.
 - c. What is the probability that the machine will fail after 8 years?. Provide also the expected value and standard deviation. Model as a binomial. (Hint: 0 success in 8 years)
 - d. What is the probability that the machine will fail after 8 years?. Provide also the expected value and standard deviation. Model as a Poisson.