

PROBABILITY DISTRIBUTIONS EXERCISES

Solve the following exercises in R by using proper functions.

1. Suppose 1000 women are screened for a rare type of cancer that has a nationwide incidence of 6 cases per 10,000. What is the probability of finding two or fewer cases? (First solve the problem by using probability density functions, then the cumulative distribution function.
2. Assuming that a fatal accident in a factory during the year is $1/1200$, calculate the probability that in a factory employing 300 workers there will be at least two fatal accidents in a year.
3. The distribution of the number of road accidents per day in a city is poisson with mean 4. Find the number of days out of 100 days when there will be (i) no accident (ii) at least 2 accidents and (iii) at most 3 accidents.
4. Commonly, car cooling systems are controlled by electrically driven fans. Assuming that the lifetime T in hours of a particular make of fan can be modelled by an exponential distribution with $\lambda = 0.0003$ find the proportion of fans which will give at least 10000 hours service. If the fan is redesigned so that its lifetime may be modelled by an exponential distribution with $\lambda = 0.00035$, would you expect more fans or fewer fans to give at least 10000 hours service?
5. The time intervals between successive barges passing a certain point on a busy waterway have an exponential distribution with mean 8 minutes. (a) Find the probability that the time interval between two successive barges is less than 5 minutes. (b) Find a time interval t such that we can be 95% sure that the time interval between two successive barges will be greater than t .