

CSCI 21013 Statistical Inference (2019/2020)

Assessment 03

Due on 5th December 2022, Time: 4.00pm

Answer all questions.

1. Let X be a random variable with mean $\mu=20$ and standard deviation $\sigma=4$. A sample of size 64 is randomly selected from this population. What is the approximate probability that the sample mean \bar{X} of the selected sample is less than 19?
2. In the first semester of the year 2020, the average return for a group of 251 investing companies was 4.5% and the standard deviation was 1.5%. If a sample of 40 companies is randomly selected from this group, what is the approximate probability that the average return of the companies in this sample was between 4% and 5% in the first semester of the year 2020?
3. A pension fund company carries out a study of a large group of mutual funds and find that their average return over a period of 5 years was 80% with a standard deviation equal to 30%. If a sample of 50 mutual funds is randomly selected from the group, what is the approximate probability that the sample had an average return greater than 90% over the 5-year period?
4. The daily number of tools produced by a company is 2000. The average length of the tools is 10 centimeters with a standard deviation equal to 0.3 centimeters. If a sample of 200 tools is selected at random, what is the approximate probability that the average length of the tools in the sample is within 0.05 centimeters of the average length?
5. An airplane has a capacity of 200 seats and a total baggage limit of 6000 kilograms. Assume the total weight X checked by each passenger is a random variable with a mean of 28 kilograms and standard deviation 15 kilograms. If 200 passengers board a flight, what is the approximate probability that the total weight of their baggage will not exceed the limit?