Question 1

A factory produces light bulbs with a lifespan that follows an unknown distribution with a mean of 1000 hours and a standard deviation of 100 hours. A random sample of 50 light bulbs is taken. What is the probability that the sample mean lifespan is between 990 and 1010 hours?

Question 2

A machine fills bottles with a liquid product. The amount filled per bottle follows a distribution with a mean of 500 ml and a standard deviation of 15 ml. If a random sample of 100 bottles is taken, what is the probability that the average amount filled is more than 502 ml?

Question 3

A university claims that the average score of its students on a national exam is 75, with a standard deviation of 8. A researcher selects a random sample of 64 students. What is the probability that the sample mean score will be less than 73?

Question 5

A survey reports that the average daily expenditure of tourists in a city is 120 dollars with a standard deviation of 25 dollars. Assuming that the daily expenditures are independent and identically distributed, what is the probability that the average daily expenditure for a random sample of 81 tourists is less than 115 dollars?