1. Suppose that $X$ is a random variable with an unknown mean $\mu$, but its variance is known to be 100. How many observations of $X$ must be taken so that the probability that $X$ is within 2 units of $\mu$ is 0.99? Answer: 166

2. Articles are shipped in lots of 1000 items. It is known that the probability that an item is defective is 0.04.
   (a) Approximate the probability that in 100 lots, the average number of defectives is less than 39.5. Answer: 0.2090
   (b) Now suppose that we would like the probability that the average number of defectives in 100 lots is less than 39.5 to be 0.10. What should the size of each lot be? Answer: 1008.

3. An elevator can carry a maximum of 1575 pounds. Suppose that the weight $W$ of a randomly selected person is $N(150, 10)$. We want the probability of overloading the elevator to be 0.05. What is the maximum number of people we should allow on the elevator? Answer: 10

4. A class has 200 graduates. Assume that each graduate invites 2 guests who attend, independently, with probability 0.8. How many seats for guests should be provided at commencement if the class desires to be 99% confident of seating everyone? Answer: 339.