Problem 1: For a certain brand of light bulb, the mean lifetime is 6500 hours with a standard deviation of 400 hours. If a random sample of 52 of these light bulbs is chosen, what is the probability that the mean lifetime of the bulbs in that sample is at least 6450 hours?

Problem 2: Based on a simple random sample, a 98% confidence interval for a proportion is given by $(0.55 \, , \, 0.65)$.

(a) Find the sample proportion $\hat{p}$ and the margin of error E.

(b) Find the necessary sample size n to obtain the above confidence interval.

Problem 3: From a simple random sample of 420 students from a college, 189 of them said that they like their fitness center. Construct a 95% confidence interval for the proportion of all students who like the fitness center of such a college.

Problem 4: A simple random sample of 33 scores of statistics exams at a college has a sample average score of 80 points and a sample standard deviation of 8 points. Find a 99% confidence interval for the true population mean of all scores of statistics exams at such a college.