1 Assume that the population of human body temperatures has a mean of 98.6°F and a standard deviation of 0.62°F. Suppose a random sample of 32 body temperatures were selected.

(a) Is the random variable body temperature normally distributed? Yes/ No/ Unknown

(b) Is the sample mean of the body temperatures approximately normally distributed? Yes/ No/ Unknown

(b) What is the mean of the sampling distribution?

(c) What is the standard error of the mean?

(d) Find \( P\left( \bar{X} < 98.3°F \right) \)

2 In an air pollution study, an experimental station obtained a mean of 2.36 micrograms of suspended benzene-soluble organic matter per cubic meter with a standard deviation of 0.48 from a random sample of size 21. What can be asserted with 90% confidence about the maximum error if \( \bar{x} = 2.36 \) micrograms is used as an estimate of the mean of the population samples?
3 Suppose you want to find the mean IQ score of a PSU student. **How many PSU students should be randomly selected for IQ tests if you want 99% confidence that the sample mean is within 2 IQ points of the population mean?** Note that the IQ tests are designed so that the mean is 100 and standard deviation is 15.

4 Researchers studied crashes of general aviation airplanes and found those pilots died 5.25% of 8411 crash landings. **Construct a 98% confidence interval for the percentage of pilot deaths in all general aviation crashes.** (Note: 5.25% = 0.0525)

5 A researcher wishes to estimate, with 95% confidence, the proportion of people who own a home computer. A previous study shows that 30% of those interviewed had a computer at home. The researcher wishes to be accurate within 2% of the true proportion. **How large a sample does he need?**
Ten randomly selected automobiles were stopped, and the tread depth of the right front tire was measured. The mean was 0.32 inch, and the standard deviation was 0.08 inch.

(a) **Find a 95% confidence interval for the mean depth.**
(b) What assumption do you have to make to answer part (a)?
(c) If the sample size was 40, how would your answer in part (a) change?

A random sample of 48 Danish pastries produced by a major bakery products manufacturer has a mean of 190 milligrams of sodium per pastry, with a standard deviation of 10 milligrams per pastry. If 190 milligrams is used as an estimate of the actual mean of the population of Danish pastries produced by this manufacturer, **what can we assert about the maximum error with 95% confidence?**
In a sample survey, 320 of 1000 persons interviewed in a large city said that they shop in the downtown area at least once a week. **What can we say with 90% confidence about the maximum error if we use the sample proportion to estimate the true proportion?**

Suppose that we want to estimate what proportion of the adult population of the US has high blood pressure, and we want to be 99% sure that the error of our estimate will not exceed 0.02. **How large a sample will we need if we have no idea what the true proportion might be?**