1. A simple random sample of size n = 40 was obtained from the population of duration times (in seconds) of eruptions of the Old Faithful geyser and the sample mean was found to be 245.025 seconds. You are trying to estimate the mean duration time (in seconds) of all eruptions of the Old Faithful geyser with a 95% confidence level.

   a. What is the best point estimate of the mean duration time (in seconds) of all eruptions of the Old Faithful geyser?

   b. If the standard deviation of the sample is unknown, which critical value should be used to find the confidence interval for the mean:

   c. What is the number of degrees of freedom that should be used to find the critical value, $t_{\alpha/2}$?

   d. Find the critical value $t_{\alpha/2}$ corresponding to n = 40 and a 95% confidence level.

   e. Give a brief general description of the number of degrees of freedom.

2. Listed below are the amounts of mercury (in parts per million or ppm) found in tuna sushi sampled at different stores in New York City. The study was sponsored by the *New York Times*, and the stores (in order) are D'Agostino, Eli's Manhattan, Fairway, Food emporium, Gourmet Garage, Grace's Marketplace, and Whole Foods. This simple random sample has a mean of 0.719 ppm and a standard deviation of 0.366 ppm. You are trying to estimate the **mean** amount of mercury in all tuna sushi with a confidence level of 90%.

$$0.56 \quad 0.75 \quad 0.10 \quad 0.95 \quad 1.25 \quad 0.54 \quad 0.88$$

a. Use the sample data to find the following:

$n =$

$\bar{x} =$

$s =$

b. Identify the value of the margin of error, E

$CL =$

$\alpha =$

$\alpha/2 =$

$df = n - 1 =$

$t_{\alpha/2} =$

$E = t_{\alpha/2} \cdot \frac{s}{\sqrt{n}} =$

c. Construct the 90% confidence interval for the mean amount of mercury in tuna sushi, μ.

d. Write a statement that correctly interprets the confidence interval in context of the question.

3. The number of chocolate chips in a sample of 40 Chips Ahoy regular cookies. The mean is 23.95 chocolate chips and the standard deviation is 2.55 chocolate chips. You are trying to estimate the mean number of chocolate chips in all Chips Ahoy cookies with a confidence level of 99%.

a. Use the sample data to find the following:

$n =$

$\bar{x} =$

$s =$

b. Identify the value of the margin of error, E.

c. Construct the 99% confidence interval for the mean number of chips in all Chips Ahoy cookies.

d. Write a statement that correctly interprets the confidence interval in context of the question.