

Instructions: Answer each question as thoroughly as possible. Round answers to 4 decimal places as needed. Exact answers are best when possible. Be sure to answer all parts of each question.

1. A weather researcher measured the temperature everyday in the month of June one year and found a mean high temperature of 81.6 in a particular city with a standard deviation of 5.1 degrees. Construct a 99% confidence interval for the mean high temperature in June in the same city for any year. (June has 30 days.)

$$ME = t^* SE = 2.756 * \frac{5.1}{\sqrt{30}} = 2.566549$$

$$(81.6 - 2.57, 81.6 + 2.57) =$$

$$(79.03, 84.17)$$

2. A poll is conducted and found that among 350 survey takers, 10% of respondents did not identify as right-handed. Construct a 90% confidence interval for the proportion of the population that is not right-handed.

$$p = 0.10 \quad SE = \sqrt{\frac{0.1(.9)}{350}} = 0.01603567 \quad z^* = 1.6448$$

$$ME = 1.6448 * 0.01603567 = 0.026376$$

$$(0.1 - 0.026, 0.1 + 0.026) = (0.0736, .126) \text{ or } (7.36\%, 12.6\%)$$

3. Explain why a confidence interval is preferred over a point estimate.

a point estimate doesn't tell you anything about how accurate the estimate is, while a confidence interval does

4. An exponential distribution has a mean of $E(X) = \frac{1}{\lambda}$. Data from an exponential distribution is collected: {3.12, 5.17, 12.06, 18.72, 11.35, 8.04, 4.53, 21.07, 6.61}. Use the method of moments to estimate the parameter λ .

$$E(X) = \text{mean} \quad \bar{x} = \frac{91.21}{9} = 10.0744$$

$$\bar{x} = \frac{1}{\lambda} \Rightarrow \lambda = \frac{1}{\bar{x}} = 0.09926...$$