



Problem 1 – Normal Distribution and z-scores Questions

Given a normal distribution with mean 50 and standard deviation 5, answer the following questions.

- What is the probability that a data point chosen at random will be between 45 and 55?
a. 10% b. 50% c. 68% d. 100%
- What is the probability that a data point chosen at random will be between 40 and 50?
a. 10% b. 25% c. 47.5% d. 68%
- Which of the following will contain approximately 95% of the data?
a. (50, 100) b. (40, 50) c. (40, 60) (5, 100)
- If 90% of the data for a normal curve must fall within an interval centered around the mean, what is the lower percentile?
a. 5th b. 10th c. 20th d. 90th
- If 95 of the data for a normal curve must fall within an interval centered around the mean, what are the percentile bounds?
a. (0, 95) b. (2.5, 97.5) c. (3, 98) d. (5, 100)
- The z-score for the 10th percentile is -1.28 . What percentile has a z-score of 1.28?
a. 60th b. 75th c. 90th d. 99th

Problem 2 – Estimating the true mean

Goal: Use \bar{x} to estimate μ , where μ is a population mean and \bar{x} is a sample mean.

To calculate a confidence interval for the true mean of the population, follow Steps 1 to 5.

Margin of Error	Confidence Interval
$E = z_{\alpha/2} \cdot \frac{\sigma}{\sqrt{n}}$	$\bar{x} - E < \mu < \bar{x} + E$

- Step 1:** Calculate \bar{x} of the sample.
- Step 2:** Find the critical value $z_{\alpha/2}$ by using the **invNorm** command.
- Step 3:** Use the formula to calculate the margin of error.
- Step 4:** Calculate the confidence interval.
- Step 5:** Interpret the result in complete sentences.

A SRS of 40 receivers in a football league is given in list **LONG**. The standard deviation for longest reception of the population is known to be 20.39. Use this sample to estimate the mean for the longest run for all receivers with a confidence interval of 95%.

Homework

Use the data from the **AVE**, **LONG**, and **YAC** lists to answer each problem.

- The standard deviation (σ) of the average reception of all receivers is known to be 6.24.
 - The standard deviation (σ) of the yards after completion of all receivers is known to be 3.8.
1. Find the Error for the 90% confidence interval for the mean of the receivers' average reception.
 2. Find the 90% confidence interval for the mean for the receivers' average reception.
 3. Find the 95% confidence interval for the mean for the receivers' average reception.
 4. Find the 99% confidence interval for the mean for the receivers' long reception.
 5. Find the 95% confidence interval for the mean for the receivers' yards after completion (YAC).
 6. A population mean falls within the calculated interval always, sometimes, or never? Explain.