Assignment 2

(75 Points)

Overview

Netflix hired a competing firm, Firm X, to administer a survey to another random sample of consumers (N=22). You are tasked with determining whether data from our firm's survey is more precise and better estimates that Netflix consumer population compared to Firm X's data.

Instructions

Download and save RScript "Assignment_2," which you will use to answer the questions below.

Document your answers on this worksheet, and upload this completed worksheet to the Assignment 2 tab on Canvas when complete.

Read and follow the notes in RScript "Assignment 2" to complete the following tasks, and answer the following questions:

Tasks

(A) Firm X's sample has a mean age of 24.23 with a standard deviation (sd) of 10.07. Thus, on average, a given respondent's age is plus or minus 10.07 years from the mean age of 24.23 years.

Run Example 1 in RScript "Assignment_2" to see how the above results were obtained.

Run the line of code that begins with "age_OurFirm" to read our firm's sampled ages into R, and modify the RScript to answer the following questions:

1. What is the mean age of our firm's sample?

Mean age =

2. What is the standard deviation (sd) of our firm's sample age?

sd age =

3. In a sentence or two, interpret the standard deviation (sd) of our firm's sample age.

(B) Firm X's standard error (SE) for their sample age is 2.15.

Run Example 2 in RScript "Assignment_2" to see how the above results were obtained.

See how the standard error (SE) is a function of the standard deviation (sd) and the sample size (N):

$$SE = \frac{sd}{\sqrt{N}}$$

A smaller standard error (SE) means the sample estimate is more precise.

4. What is the standard error (SE) for our firm's sample age?

SE age =

5. Briefly explain why our firm's standard error (SE) for age is relatively smaller compared to Firm X.

6. Briefly explain which firm's age estimate you expect is more precise, and why?

(C) Firm X's margin of error (MoE) for their sample age is 6.08.

Run Example 3 in RScript "Assignment_2" to see how the above results were obtained.

See how the margin of error (MoE) is the function of a critical value from a probability distribution, like a Z or t distribution, and the standard error of a sample statistic, like a mean.

$$MoE = t \times SE$$

7. What is the margin of error (MoE) for our firm's sample mean age?

MoE age =

8. Briefly explain why our firm's MoE for mean age is relatively smaller compared to Firm X.

(D) Firm X's 95% confidence interval (CI) for their sample mean age is (18.15,30.31). Thus, based on their sample, it is expected that 95% of all possible random samples (N=22) from the Netflix consumer population would contain a mean age between 18.15 and 30.31.

Run Example 4 in RScript "Assignment_2" to see how the above results were obtained.

See how a confidence interval (CI) for a sample statistic is a function of its margin of error (MoE).

$$CI = \hat{\theta} \pm MoE$$

9. What is the 95% confidence interval (CI) for our firm's sample mean age?

95% CI age =

10. In a sentence or two, interpret the 95% confidence interval (CI) for our firm's sample mean age.

11. Briefly explain why our firm's 95% confidence interval (CI) for age is relatively narrower, more precise, compared to Firm X.

(E) Our firm's sample age appears to differ in some ways compared to Firm X's sample age. However, is our firm's sample mean age statistically different from Firm X's?

Two-sample t-test: two-tailed

H_0: Our firm's sample mean age = Firm X's sample mean age

H_a: Our firm's sample mean age ≠ Firm X's sample mean age

Run the two-sample t-test in RScript "Assignment_2" to obtain results, where alpha is set at 0.05.

If the p-value is < than 0.05 then reject H_0

If the p-value is > than 0.05 then fail to reject H_0

12. In a sentence or two, interpret the results from this two-sample t-test.