Week 07 Quiz: t Confidence Intervals

Problem 1

In hypothesis testing, the null hypothesis (Ho) is best defined as:
a) The hypothesis the researcher wants to prove.
b) The hypothesis that states there is an effect or a difference.
c) A statement of no effect, no difference, or status quo.
d) The conclusion drawn when the results are statistically significant.

Answer: C

Problem 2.

A p-value is the probability of obtaining the observed sample result, or something more extreme, assuming that:
a) The alternative hypothesis is true.
b) The sample is randomly selected.
c) The null hypothesis is true.
d) The research hypothesis is false.

Answer: C

Problem 3

In a formal hypothesis test, if the p-value is less than the chosen significance level (α), we:
a) Fail to reject the null hypothesis.
b) Accept the null hypothesis.
c) Reject the null hypothesis.
d) Accept the alternative hypothesis.

Answer: C

Problem 4

A two-tailed test is used when the alternative hypothesis is:
a) $\mu > \mu_0$
b) $\mu < \mu_0$
c) $\mu = \mu_0$
d) $\mu \neq \mu_0$

Answer: D

Problem 5

A test statistic is calculated to measure:
a) The practical importance of the result.
b) How far the sample statistic is from the null parameter, in standard error units.
c) The p-value directly.
d) The probability that the null hypothesis is true.

Answer: B

Problem 6

Which of the following p-values would provide the strongest evidence against the null hypothesis?
a) 0.95
b) 0.50
c) 0.10
d) 0.001

Answer D

Problem 7

In the context of a one-sample t-test for a mean, the null hypothesis is typically written as:
a) $H_0: \bar{x} = \mu_0$
b) $H_0: \mu = \mu_0$
c) $H_0: \mu \neq \mu_0$
d) $H_0: p = p_0$

Answer: B

Problem 8

A result is said to be "statistically significant" when:
a) The p-value is larger than the significance level α.
b) The effect is large enough to be practically important.
c) The p-value is smaller than the significance level α.
d) The null hypothesis is proven to be true.

Answer: C

Problem 9

What is the primary purpose of hypothesis testing?
a) To estimate a population parameter.
b) To assess the evidence provided by data about a claim regarding a population.
c) To describe the characteristics of a sample.
d) To calculate the probability that a research hypothesis is correct.

Answer: B.

Problem 10

If a test result has a p-value of 0.03 and the significance level is $\alpha = 0.05$, what is the correct decision?
a) Reject the null hypothesis.
b) Fail to reject the null hypothesis.
c) Accept the null hypothesis.
d) Accept the alternative hypothesis.

Answer: A

Problem 11

A test statistic is:
a) A population parameter.
b) A number, calculated from the sample data, used to decide whether to reject H_0.
c) The same as the p-value.
d) Always a z-score.

Answer: B

Problem 12

The null and alternative hypotheses are stated in terms of:
a) Sample statistics.
b) P-values.
c) Population parameters.
d) Critical values.

Answer: C

Problem 13

If the p-value is high (e.g., 0.65), what should we conclude?
a) The null hypothesis is false.
b) The evidence against the null hypothesis is strong.
c) The evidence against the null hypothesis is weak.
d) The alternative hypothesis is true.

Answer: C

Problem 14

A 95% confidence interval for a population mean is calculated from a sample as (45, 55). If we were testing H_0: $\mu = 50$ vs. H_1: $\mu \neq 50$ at $\alpha = 0.05$, we would:
a) Reject H_0 because 50 is in the interval.
b) Fail to reject H_0 because 50 is in the interval.
c) Reject H_0 because the interval is too wide.
d) Fail to reject H_0 because the interval does not contain 0.

Answer: B

Problem 15

Which of the following is *not* a step in conducting a hypothesis test?
a) State the null and alternative hypotheses.
b) Collect sample data and compute the test statistic.
c) Assume the alternative hypothesis is true for the calculation.
d) Compute the p-value and compare it to α.

Answer: C