# Week 08 Hypothesis Testing Logics

**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 $\alpha$.
b) The effect is large enough to be practically important.
c) The p-value is smaller than the significance level $\alpha$.
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 $\alpha$.

**Answer: C**