

## Practice Assignment: Null and Alternative Hypothesis for Means

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- 1) Scenario: A researcher gathers information on retirement age to see if it is different than 65 years. A random sample of 34 retired people finds that the average age of retirement is 61.8 years with a standard deviation of 10. The histogram of the retirement ages from the sample looks approximately normal. The research question is “Is the mean retirement age different from 65 years?”

Part A: What type of distribution would be used in a hypothesis test to answer this research question? Explain.

Answer: The t Distribution is appropriate to answer this question because the researcher wants to test a hypothesis about the population mean, and the population standard deviation is not known.

Part B: Explain whether or not the conditions for the test are met.

Answer: The first condition of a random sample is met, given the description of the data in the scenario. The second condition of a large sample size is met with  $n = 34$ .

Part C: Is this research question answered by a one-sample or two-sample test?

Answer: One-sample test

Part D: What is the null hypothesis?

Answer:  $H_0: \mu = 65$

Part E: What is the alternative hypothesis?

Answer:  $H_A: \mu \neq 65$

- 2) If you hypothesize that there will be a difference between mean patient satisfaction scores from Hospital A and Hospital B but you do not hypothesize the direction, you would have:
- A two-tailed alternative hypothesis
  - A one-tailed alternative hypothesis
  - A null hypothesis
  - A two-tailed null hypothesis

Answer: a

- 3) The process of hypothesis testing starts with the assumption that:
- a) The null hypothesis is true.
  - b) The null hypothesis is false
  - c) The alternative hypothesis is true.
  - d) We don't know whether the null hypothesis or the alternative hypothesis is true.

Answer: a

- 4) Scenario: A hospital in Nashville is considering changes to the prenatal care they offer. They collect a random sample of 70 gestation times for pregnancies that ended in live births. The histogram of the gestation times of the pregnancies in the sample is slightly skewed to the left. The established human gestation time is 266 days. The hospital wants to know whether the average gestation time at their hospital is different from 266 days.

Part A: What is the null hypothesis?

Answer:  $H_0: \mu = 266$

Part B: What is the alternative hypothesis?

Answer:  $H_A: \mu \neq 266$

Part C: Determine whether this statement is true or false: The conditions for using the t-test are met.

Answer: True

- 5) Scenario: An airline company is interested in comparing the average number of passengers between their low-cost airline and their premium airline. The company collects a random sample of 60 flights each from their low-cost airline and their premium airline. The mean number of passengers on each airline was calculated along with the standard deviation. The airline company wants to know if the mean number of passengers is greater on the premium airline compared to the low-cost airline.

Part A: Is this research question answered by a one-sample or two-sample test?

Answer: Two-sample test

Part B: What is the null hypothesis? Make sure to define the parameters of interest using the correct notation.

Answer:  $H_0: \mu_1 - \mu_2 = 0$ , where  $\mu_1$  is the population mean for the number of passengers on the low-cost airline and  $\mu_2$  is the population mean for the number of passengers on the premium airline

Part C: What is the alternative hypothesis? Make sure to define the parameters of interest using the correct notation.

Answer:  $H_A: \mu_1 - \mu_2 < 0$ , where  $\mu_1$  is the population mean for the number of passengers on the low-cost airline and  $\mu_2$  is the population mean for the number of passengers on the premium airline

