

Practice 10

8.1 Hypothesis Testing

8.2 Z-Test for Mean

- 1) A new organic pest control formula is being tested on potato plants to see whether it can reduce the level of potato beetle infestation. The mean number of beetles per untreated plant is 12. It is hoped that the new formula may reduce this infestation rate. State the appropriate null and alternate hypotheses. 1) _____
- A) $H_0: \mu = 12, H_1: \mu \neq 12$ B) $H_0: \mu = 12, H_1: \mu < 12$
- 2) A sample of 85 chewable vitamin tablets have a sample mean of 249 milligrams of vitamin C. Nutritionists want to perform a hypothesis test to determine how strong the evidence is that the mean mass of vitamin C per tablet differs from 253 milligrams. State the appropriate null and alternate hypotheses. 2) _____
- A) $H_0: \mu = 249, H_1: \mu \neq 249$ B) $H_0: \mu = 253, H_1: \mu \neq 253$
- 3) A recent survey of gasoline prices indicated that the national average was \$4.098 per gallon. The Dallas Automobile Club claimed that gasoline in Texas was significantly lower than the national average. A survey covering 10 different suburbs in Dallas found the average price of gasoline to be \$3.924 per gallon with a population standard deviation of \$0.053. What critical value should be used to test the claim using $\alpha = 0.01$? 3) _____
- A) -2.33 B) 2.33
- 4) A test is made of $H_0: \mu = 47$ versus $H_1: \mu > 47$. A sample of size $n = 69$ is drawn, and $\bar{x} = 48$. The population standard deviation is $\sigma = 27$. $\alpha = 0.05$. Compute the value of the test statistic z . 4) _____
- A) 0.62 B) 1.60 C) 0.31 D) 0.04
- 5) A test is made of $H_0: \mu = 55$ versus $H_1: \mu > 55$. A sample of size $n = 62$ is drawn, and $\bar{x} = 62$. The population standard deviation is $\sigma = 27$. Compute the value of the test statistic z and determine if H_0 is rejected at the $\alpha = 0.01$ level. 5) _____
- A) 0.26, H_0 rejected B) 2.04, H_0 not rejected

- 6) The Golden Comet is a hybrid chicken that is prized for its high egg production rate and gentle disposition. According to recent studies, the mean rate of egg production for 1-year-old Golden Comets is 5.5 eggs/week. 6) _____
Sarah has 42 1-year-old hens that are fed exclusively on natural scratch feed: insects, seeds, and plants that the hens obtain as they range freely around the farm. Her hens exhibit a mean egg-laying rate of 5.7 eggs/day.
Sarah wants to determine whether the mean laying rate μ for her hens is higher than the mean rate for all Golden Comets. Assume the population standard deviation to be $\sigma = 1.2$ eggs/day. $\alpha = 0.05$. Compute the value of the test statistic.
A) 1.08 B) 0.86 C) 1.18 D) 0.17
- 7) At a water bottling facility, a technician is testing a bottle filling machine that is supposed to deliver 1,000 milliliters of water. The technician dispenses 42 samples of water and determines the volume of each sample. The 42 samples have a mean volume of $\bar{x} = 1,001.1$ mL. The machine is out of calibration if the mean volume differs from 1,000 mL. 7) _____
The technician wants to perform a hypothesis test to determine whether the machine is out of calibration. The standard deviation of the dispensed volume is known to be $\sigma = 6.1$. $\alpha = 0.05$. Compute the value of the test statistic.
A) 0.17 B) 2.89 C) 0.18 D) 1.17
- 8) A recent survey indicated that the average amount spent for breakfast by business managers was \$7.58 with a standard deviation of \$0.42. It was felt that breakfasts on the West Coast were higher than \$7.58. A sample of 81 business managers on the West Coast had an average breakfast cost of \$7.65. $\alpha = 0.05$. Find the P -value for the test. 8) _____
A) 0.2734 B) 0.4332 C) 0.0668 D) 0.1325

Answer Key

Testname: STA2023_PRACTICE10

- 1) B
- 2) B
- 3) A
- 4) C
- 5) B
- 6) A
- 7) D
- 8) C