

MATH 1342

Homework 11 (Sections 8.1 – 8.2)

Instructions: Answer all questions through the EMCF tab of casa under the assignment named “Homework 11” before the deadline.

There is no “Submit” button. Your answers will be automatically submitted once the deadline arrives.

Assignments will be graded out of 20 points.

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|---------------------------|---------|----------|
| 1. Section 8.1; Problem 2 | A. True | B. False |
| 2. Section 8.1; Problem 3 | A. True | B. False |
| 3. Section 8.1; Problem 6 | A. True | B. False |
| 4. Section 8.1; Problem 7 | A. True | B. False |

5. Section 8.1; Problem 8: (Null and Alternate Hypothesis, Rejection Region)

- A. $H_0: \mu = 120$; $H_a: \mu < 120$; Rejection Region: $z < -1.64$
- B. $H_0: \mu = 120$; $H_a: \mu < 120$; Rejection Region: $t < -1.80$
- C. $H_0: \mu = 120$; $H_a: \mu > 120$; Rejection Region: $z > 1.64$
- D. $H_0: \mu = 120$; $H_a: \mu \neq 120$; Rejection Region: $z < -1.96$ or $z > 1.96$
- E. $H_0: \mu = 120$; $H_a: \mu \neq 120$; Rejection Region: $t < -2.20$ or $t > 2.20$

6. Section 8.1; Problem 8: (Test Statistic)

- A. $t = 0.03$
- B. $z = 1.46$
- C. $z = 0.03$
- D. $z = 0.55$
- E. $t = 1.46$

7. Section 8.1; Problem 8: (p-value and conclusion)

- A. $p = 1.856$; FRH_0 (No sufficient evidence to reject the claim)
- B. $p = 0.144$; RH_0 (Sufficient evidence exists to reject the claim)
- C. $p = 0.928$; FRH_0 (No sufficient evidence to reject the claim)
- D. $p = 1.856$; RH_0 (Sufficient evidence exists to reject the claim)
- E. $p = 0.144$; FRH_0 (No sufficient evidence to reject the claim)

8. Section 8.1; Problem 11: (Null and Alternate Hypothesis, Rejection Region)

- A. $H_0: \mu = 300$; $H_a: \mu < 300$; Rejection Region: $z < -1.64$
- B. $H_0: \mu = 300$; $H_a: \mu < 300$; Rejection Region: $t < -2.02$
- C. $H_0: \mu = 300$; $H_a: \mu > 300$; Rejection Region: $z > 1.64$
- D. $H_0: \mu = 300$; $H_a: \mu \neq 300$; Rejection Region: $z < -1.96$ or $z > 1.96$
- E. $H_0: \mu = 300$; $H_a: \mu \neq 300$; Rejection Region: $t < -2.57$ or $t > 2.57$

9. Section 8.1; Problem 11: (Test Statistic and Conclusion)

- A. -0.789 ; FRH_0 (No sufficient evidence to reject the claim)
- B. -1.576 ; RH_0 (Sufficient evidence exists to reject the claim)
- C. -1.576 ; FRH_0 (No sufficient evidence to reject the claim)
- D. -0.789 ; RH_0 (Sufficient evidence exists to reject the claim)
- E. -0.132 ; FRH_0 (No sufficient evidence to reject the claim)

10. Section 8.1; Problem 14: (Null and Alternate Hypothesis, Rejection Region)

- A. $H_0: \mu = 0$; $H_a: \mu < 0$; Rejection Region: $z < -2.34$
- B. $H_0: \mu_D = 0$; $H_a: \mu_D < 0$; Rejection Region: $t < -2.57$
- C. $H_0: \mu = 0$; $H_a: \mu > 0$; Rejection Region: $z > 2.34$
- D. $H_0: \mu_D = 0$; $H_a: \mu_D \neq 0$; Rejection Region: $z < -2.58$ or $z > 2.58$
- E. $H_0: \mu_D = 0$; $H_a: \mu_D \neq 0$; Rejection Region: $t < -2.90$ or $t > 2.90$

11. Section 8.1; Problem 14: (Mean Difference, and Test Statistic)

- A. $\mu_D = -1.889$; $t = -2.331$
- B. $\mu_D = -2.444$; $t = -9.891$
- C. $\mu_D = -1.889$; $z = -2.331$
- D. $\mu_D = -2.444$; $t = -2.331$
- E. $\mu_D = -211.278$; $z = 18.333$

12. Section 8.1; Problem 14: (p-value and conclusion)

- A. $p = 0.026$; FRH_0 (No sufficient evidence to reject the claim)
- B. $p = 0.038$; RH_0 (Sufficient evidence exists to reject the claim)
- C. $p = 0.038$; FRH_0 (No sufficient evidence to reject the claim)
- D. $p = 0.016$; RH_0 (Sufficient evidence exists to reject the claim)
- E. $p = 0.016$; FRH_0 (No sufficient evidence to reject the claim)

13. Section 8.2; Problem 2: (Null and Alternate Hypothesis, Rejection Region)

- A. $H_0: p = 0.90$; $H_a: p < 0.90$; Rejection Region: $z < -2.576$
- B. $H_0: p = 0.90$; $H_a: p < 0.90$; Rejection Region: $z < -2.326$
- C. $H_0: p = 0.90$; $H_a: p > 0.90$; Rejection Region: $z > 2.326$
- D. $H_0: p = 0.90$; $H_a: p > 0.90$; Rejection Region: $z > 1.960$
- E. $H_0: p = 0.90$; $H_a: p \neq 0.90$; Rejection Region: $z < -2.576$ or $z > 2.576$

14. Section 8.2; Problem 2: (Test Statistic and conclusion)

- A. $z = 0.333$; FRH_0 (No sufficient evidence to reject the claim)
- B. $z = 0.351$; RH_0 (Sufficient evidence exists to reject the claim)
- C. $z = 0.333$; RH_0 (Sufficient evidence exists to reject the claim)
- D. $z = 0.351$; FRH_0 (No sufficient evidence to reject the claim)
- E. $z = 0.00033$; RH_0 (Sufficient evidence exists to reject the claim)

15. Section 8.2; Problem 8: (Null and Alternate Hypothesis and Test Statistic)

- A. $H_0: p = 0.50$; $H_a: p < 0.50$; $z = 0.800$
- B. $H_0: p = 0.50$; $H_a: p > 0.50$; $z = 0.800$
- C. $H_0: p = 0.50$; $H_a: p > 0.50$; $z = 0.081$
- D. $H_0: p = 0.50$; $H_a: p \neq 0.50$; $z = 0.800$
- E. $H_0: p = 0.50$; $H_a: p \neq 0.50$; $z = 0.081$

16. Section 8.2; Problem 8: (p-value and conclusion)

- A. $p = 0.540$; FRH_0 (No sufficient evidence to reject the claim)
- B. $p = 0.424$; RH_0 (Sufficient evidence exists to reject the claim)
- C. $p = 1.576$; FRH_0 (No sufficient evidence to reject the claim)
- D. $p = 0.424$; FRH_0 (No sufficient evidence to reject the claim)
- E. $p = 1.576$; RH_0 (No sufficient evidence to reject the claim)

17. Section 8.2; Problem 10:

- A. Getting the first down
- B. Going for the first down and not getting it
- C. Not going for the first down that could have been made

18. You wish to determine the effectiveness of taking Omega-3 tablets to lower a person's cholesterol. To determine this, you collect data on the cholesterol level of 50 individuals before and after a 6-week course of Omega-3 tablets. Which test would determine if this treatment was effective?

- A. Two-Sample t-test for means
- B. Two-Sample z-test for means
- C. Matched-Pairs t-test
- D. Two-Sample z-test for proportions

19. The choice between a z-test and a t-test for a population mean depends primarily on:

- A. the sample size.
- B. the level of significance.
- C. whether a one- or two-tailed test is indicated.
- D. whether the given standard deviation is from the population or the sample.
- E. a z-test should never be used.

20. A company claims that it has a mean customer service score of 78 (out of 100). You examine 150 customer reviews and find that the mean score of those reviews is 73 with a standard deviation of 2. Test the accuracy of the company's claim at the 2% significance level.

Proposed Solution:

$$H_0: \mu = 78$$

$$H_a: \mu < 78 \text{ (since } \bar{x} \text{ is less than 78)}$$

$$\text{Rejection Region: } qt(0.02, 149); t < -2.07$$

$$\text{Test Statistic: } t = (73-78)/(2/\sqrt{150}) = -30.61$$

In rejection region: (RHo)

$$\text{P-Value Test: } pt(-30.61, 149) = 0\%$$

$$p < \alpha \text{ (RHo)}$$

The customer value score is lower than the claimed 78.

What is wrong with the proposed solution?

- A. A z-test should have been used instead of t-test.
- B. \hat{p} should be calculated as $78/100 = 0.78$ and a proportion test used.
- C. The alternate hypothesis is not supported by the question.
- D. For $p < \alpha$, the wrong conclusion was drawn.
- E. There is nothing wrong with the proposed solution.