Quiz 13 Review

Name: Key

Hypothesis Testing

Date:________ Period:________

Vocabulary

1. Hypothesis Testing is a decision-making process for evaluating claims about a population
2. A Statistical hypothesis is a conjecture about a parameter; conjecture may or may not be true
3. A statement of equality to be tested; denoted: H_o is called a null hypothesis.
4. A statement of inequality that is the complement of the null; denoted: H_a is called a alternative hypothesis.
5. A Critical value separates the critical region from the non-critical region
6. The Critical region is the shaded portion and it indicates a significant difference and that the null should be rejected.
7. The non-critical region is not shaded and means that the difference is probably due to chance and that the null hypothesis should not be rejected
8. One - or Two -tailed test indicates that the null should be rejected when the test value is in the critical region
9. A Statistical test uses the data obtained from a sample to make a decision about whether or not the null hypothesis should be rejected
10. A test value is a number obtained to decide whether or not to reject the null hypothesis

Work Problems

Pg. 69-70 –Intro to Hypothesis Testing

For the following pairs, indicate which do not comply with the rules for setting up hypotheses, and explain why:

11. H_o: μ = 15
    H_a: μ = 15
    H_a cannot use =

12. H_o: p = .4
    H_a: p > .6
    must be the same #

13. H_a: μ = 123
    H_o: μ < 123
    labeled wrong

State the null and alternative hypotheses for each conjecture.

14. A psychologist feels that playing soft music during a test will change the results of the test. The psychologist is not sure whether the grades will be higher or lower. In the past, the mean of the scores was 73. What are the null and alternative hypotheses?

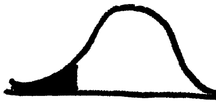
    $H_o: \mu = 73$ $H_a: \mu \neq 73$

15. A researcher thinks that if expectant mothers use vitamin pills, the birth weight of the babies will increase. The average birth weight of the population is 8.6 pounds. What are the null and alternative hypotheses?

    $H_o: \mu = 8.6$ $H_a: \mu > 8.6$

Assume that the data has a normal distribution. Draw a figure and answer each question.

16. Find the z-critical value for a left tailed test, when $\alpha = 0.08$



one tail
$\alpha = 0.08$

$0.5 - 0.08 = \underbrace{.4200}_{\text{Table E}}$

$\boxed{Z_{\frac{\alpha}{2}} = -1.41}$

17. Find the t-critical value for a $\alpha = 0.50$ for a two-tailed test with n=24

$\left.\begin{array}{l} df = 23 \\ \text{two tails} \\ \alpha = 0.50 \end{array}\right\}$ Table F

$\boxed{t_{\frac{\alpha}{2}} = \pm .685}$

18. Find the z-critical value for a right tailed test, when $\alpha = 0.20$

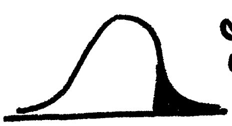
one tail
$\alpha = 0.20$

$0.5 - 0.20 = \underbrace{.3000}_{\text{Table E}}$

$\boxed{Z_{\frac{\alpha}{2}} = +.84}$

19. Find the t-critical value used to test a null hypothesis. $\alpha = 0.025$ and Ha: $\mu > 64.10$ for $n=14$

right tailed!



$\left.\begin{array}{l} df = 13 \\ \text{one tail} \\ \alpha = .025 \end{array}\right\}$ Table F

$\boxed{t_{\frac{\alpha}{2}} = +2.160}$

Pg. 73-74 –Conducting a Hypothesis Test for the Mean when n>30

Answer the following. Complete all four steps.

20. The EPA reports that the exhaust emissions for a certain car model have a mean of 1.45g of nitrous oxide per mile and a standard deviation of 0.4. The manufacturer claims their new process reduces the mean level of exhaust emitted for this car model. A SRS of 28 cars is taken and the mean level of exhaust is 1.51g. At $\alpha=0.05$, is there enough evidence to support the claim?

① $H_0: \mu = 1.45$ $H_a: \mu < 1.45$

② 

one tail
$\alpha = 0.05$

-1.65

$.5 - 0.05 = .4500$ $Z_{\frac{\alpha}{2}} = -1.65$

③ $Z = \frac{(1.51 - 1.45)}{(.4/\sqrt{28})} = .79$

④ Since the test value is NOT in the CR we fail to reject $H_0: \mu = 1.45$.

21. Credit card usage has a current mean of \$2500 per year. A company gives new cards to a sample of 51 customers and found the sample mean to be \$2542. Assume the population standard deviation is \$109. At $\alpha=0.02$, is there enough evidence to support the claim?

① $H_0: \mu = 2500$ $H_a: \mu > 2500$

②  $.5 - 0.02 = .4800$ $Z_{\frac{\alpha}{2}} = +2.05$

③ $Z = \frac{(2542 - 2500)}{(109/\sqrt{51})} = 2.75$

④ Since the test value FALLS into the CR, we REJECT $H_0: \mu = 2500$.

22. A production line produces rulers that are supposed to be 12 inches long. A sample of 49 of the rulers had a mean of 12.1 and a standard deviation of .5 inches. The quality control specialist responsible for the production line decides to do a hypothesis test at $\alpha=0.01$ to determine whether the production line is really producing rulers that are 12 inches long or not.

① $H_0: \mu = 12$ $H_0: \mu \neq 12$

② 

two tails
$\alpha = 0.01$

$0.5 - \left(\frac{0.01}{2}\right) = .4950$ $Z_{\frac{\alpha}{2}} = \pm 2.58$

③ $Z = \frac{(12.1 - 12)}{(.5/\sqrt{49})} = 1.4$

④ Since the test value does NOT fall in the CR we fail to reject $H_0: \mu = 12$