

Complete both pages. Write your answers in the space provided, scratch paper isn't graded. Round answers to 2 decimal places.

- 1(____/3). DEFINITION. (a) For a test statistic e , define the p -value of e .
 (b) A Type II error is:
 (c) The *power* of a test is:
 (d) Given df , t_α is the point for which:
- 4(____/8). You wish to show, at 5% significance, that the average price of a 1 lb. loaf of bread in a supermarket in Hawaii exceeds \$1.75. The average price at 16 supermarkets is $\bar{x} = \$1.80$ with std. dev. 4ϕ .
 (a) State the null and alternate hypotheses.
 (b) Find the standard error.
 (c) Find the rejection region for \bar{x} .
 (d) Find the t -score of $\bar{x} = 1.80$.
 (e) Find the rejection region for the t -score of \bar{x} .
 (f) Find the p -value of $\bar{x} = 1.80$.
 (g) Find the 95% confidence interval for the average price you found.
 (h) What is your conclusion?
- 5(____/8). You wish to compare the price of bread at large supermarkets with the price at small corner stores and to determine if there is a difference. The price at 30 supermarkets is \$1.80 with std. dev. 10ϕ ; the price at 40 corner stores is \$1.88 with std. dev. 15ϕ .
 (a) State the null and alternate hypotheses. What is α ?
 (b)(2) Find the best standard error estimate.
 (c) Find the acceptance region for $\bar{x}_1 - \bar{x}_2$.
 (d) Find the z -score of $\bar{x}_1 - \bar{x}_2$.
 (e)(2) Find the p -value of $\bar{x}_1 - \bar{x}_2$.
 (f) What is your conclusion?
- 6(____/6). You wish to compare the price of bread at large supermarkets with the price at small corner stores and to determine if there is a difference. The price at 10 supermarkets is \$1.80 with std. dev. 10ϕ ; the price at 15 corner stores is \$1.88 with std. dev. 15ϕ .
 (a)(2) Find the standard error.
 (b)(2) Find df , the degrees of freedom.
 (c) Find the rejection region for $\bar{x}_1 - \bar{x}_2$.
 (d) What is your conclusion?

- 7(____/9). A random sample of 100 observations has a mean of 48 and a std. dev. of 10. You wish to determine if the mean differs from the accepted value of 50. You wish your conclusions to be accurate at the 1% significance level.
 (a) State the null and alternate hypotheses and find the standard error.
 (b) Find the acceptance region.
 (c) Should you reject the null hypothesis?
 (d) Find the probability of falsely rejecting the null hypothesis.
 (e)(3) Find the probability of falsely accepting the null hypothesis if the actual mean (the alternate value) is 49.
 (f)(2) Find the probability of falsely accepting the null hypothesis if the actual mean is 45.

- 8(____/9). Measurements of the number of successes in two binomial populations produce the following results.

	population 1	population 2
successes	30	20
number trials	40	30

Does this refute, at 1% significance, the assumption that the proportion 1 is \leq proportion 2?

- (a)(3) Find the standard error.
 (b) Find the rejection region for $p_1 - p_2$.
 (c)(2) Find the p -value of the observed difference.
- 9(____/7). A machine is supposed to fill boxes of raisins with 3 oz. of raisins with a std. dev. of at most .1. The weights of 10 randomly chosen sample boxes are 2.9, 3.1, 3.4, 2.8, 2.9, 2.6, 2.5, 3.4, 3.5, 3.6.
 (a)(3) Find the one-sided acceptance region for s^2 around the null value for the variance. $\alpha = .01$.
 (b) Is the std. dev. worse than the required .1 at the 1% significance level?
 (c)(3) Find the one-sided 99% confidence region for σ^2 around the measured variance.

Answers

- 1, See Review 3. 3. 450
 4. (b) .01 (c) $[1.77, \infty)$ (d) 5 (e) $(1.753, \infty)$ (f) 0 (g) $[1.78, \infty)$
 5. (b) .03 (c) $[-.06, .06]$ (d) -2.66 (e) .0078 (f) reject H_0
 6. (a) .05 (b) 23 (c) $(-\infty, -.1] \cup [.1, \infty)$ (d) accept H_0
 7. (b) $[47.42, 52.58]$ (c) no (d) 1% (e) 94% (f) .8%
 8. (a) .109 (b) $[.254, \infty)$ (c) .2327
 9. (a) $\chi^2 = 136.1$, $\chi^2_{.01,9} = 21.666$, Yes, significantly worse.
 (b) $s^2 \in [0, .024]$ (c) $\sigma^2 \in [.0628, \infty)$