Homework 7 Solution

Sta113, ISDS

April 6, 2003

Total 23 points.

9.28

4 points

- Notice that the alternative hypothesis indicates a two tailed test. For example, as for (a),$p = P(z \leq -1.01) + P(z \geq 1.01)$.

9.32

3 points

- a. Let μ_1 = mean performance rating of competitive R&D contracts and μ_2 = mean performance rating for sole source R&D contracts. The the null hypothesis $H_0 : \mu_1 = \mu_2 = 0$. Alternative hypothesis $H_a : \mu_1 > \mu_2$.
- b. The alternative hypothesis indicates a one-tailed test. So the rehection region is $z > 1.645$.
- c. Since $0.05 > p - value$, we reject H_0.

9.35

2 points

- The null hypothesis $H_0 : \mu_1 = \mu_2$ and alternative hypothesis $H_a : \mu_1 \neq \mu_2$, where μ_1 and μ_2 are the mean oxon/thion ratios of foggy and that of clear/cloudy respectively.

9.42

2 points

- We wish to test $H_0 : \mu_d = 0$ vs $H_a : \mu_d < 0$. Notice this is a one-tailed test.

9.44

2 points

- Let μ_1 =mean day-long clear-sky solar radiation in St. Joseph, MO, and μ_2 =mean day-long clear-sky solar radiation level in Iowa Great Lakes. To test $H_0 : \mu_1 = \mu_2 = 0$ vs $H_a : \mu_1 \neq \mu_2$, get the p-value of 0.0001.

9.46

2 points

- Let p=proportion of healthy, non-pregnant women who become uncomfortably hot when their core temperature reaches 40^oC. We test $H_0 : p = 0.75$ vs $H_a : p < 0.75$. In order for the test to be valid, we should check that $\hat{p} \pm 2\sqrt{\frac{\hat{p}(1-\hat{q})}{n}}$ must not contain 0 or 1.

9.49

2 points

- We test $H_0 : P = 0.8$ vs $H_a : P < 0.8$. Rejection region is $z < -z_\alpha$, where $z = \frac{\hat{p}-0.8}{\sqrt{0.8 \cdot 0.2/100}}$.

9.52

2 points

- To determine a difference in the proportions, we test $H_0 : p1 = p2 = 0$ vs $H_\alpha : p1 \neq p2$. The test statistics is $z = \frac{\hat{p}_1 - \hat{p}_2 - D_0}{\sqrt{\hat{p}\hat{q}(1/n_1 + 1/n_2)}}$.

9.73

2 points

- Use the test statistics $z = \frac{\mu_1 - \mu_2}{\sqrt{\frac{1}{n}(s_1^2 + s_2^2)}}$. Notice that 2(n-1) is the degrees of freedom.

9.74

2 points

- Use the test statistics $z = \frac{\bar{d}}{s_d/\sqrt{n}}$, where $\bar{d} = \sum_{i=1}^{n}(x_i - y_i)/n$ the difference between theoretical mean and experimental mean. s_d is the standard error of the difference.