Assignment 11 Solution

1.

$H_0 : \mu = 6$, $H_1 : \mu < 6$

Rejection region: $t < -t_{0.05,9} = -1.833$

Test statistic: t = -3.0

Conclusion: Reject H_0. Yes, .we can infer at α = 0.05 that the population mean is less than 6.

2.

$H_0 : \sigma^2 = 0.01$ vs. $H_1 : \sigma^2 \neq 0.01$

Rejection region: $\chi^2 < \chi^2_{0.975,9}$= 2.7 or $\chi^2 > \chi^2_{0.025,9}$=19.023

Test statistic: $\chi^2 = 1.6641$

Conclusion: Reject H_0. We can infer that the population variance differs from 0.01

3.

LCL = $\frac{(n-1)S^2}{X^2_{0.025,8}} = 10.95$

UCL = $\frac{(n-1)S^2}{X^2_{0.975,8}} = 88.073$

4.

$H_0 : \sigma^2 = 450$, $H_1 : \sigma^2 < 450$

Rejection region: $\chi^2 < \chi^2_{0.90,9}$ =4.168

Test statistic: χ^2 = 7.2

Conclusion: Don't reject H_0. No, she can't conclude at the 10% significance level that the variance has decreased

5.

Sol:

a. 0.48 ± 0.0438 $(0.48 \pm 1.96 * 0.0223)$
b. 0.48 ± 0.0489 $(0.48 \pm 1.96 * 0.0249)$
c. 0.48 ± 0.0565 $(0.48 \pm 1.96 * 0.0228)$
d. the interval widens

6.

Sol:

a. 0.2709

$$S_p = \sqrt{\frac{P(1-P)}{n}}\sqrt{\frac{0.6*0.4}{100}} = 0.0489$$

$Z = \frac{(0.63-0.6)}{0.0489}$ =0.6134; $P(P > 0.6134) = 0.5 - 0.2291 = 0.2709$

b. 0.1992

c. 0.1112

d. the p-value decreases.

7.

$\hat{p} = \frac{217}{418}$=0.52, $S_{\hat{p}} = \sqrt{\frac{0.52*0.48}{418}} = 0.0245$

confidence interval: $0.52 \pm 1.645 * 0.0245 = 0.52 \pm 0.04$

8.

a.

$\hat{p} = \frac{68}{400}$=0.17, $S_{\hat{p}} = \sqrt{\frac{0.17*(1-0.17)}{400}} = 0.0187$

Confidence interval: $0.17 \pm 1.96 * 0.0187 = 0.17 \pm 0.0368$

b.

$H_0: p = 0.6; H_1: p > 0.6$

$$Z_a = 1.645; Z - statistic: \frac{0.17 - 0.6}{\sqrt{\frac{0.6*0.4}{400}}} = -17.5510$$

Conclusion: since -17.55< 1.645. Do not reject H_0. She can not conclude at the 5% significance level that more than 60% traveler do not buy the tickets.