D

Name___Key_____

Date___/___/_____

Illowsky – Chapt. 9 & 10

Larson – Chapt. 7 & 8

Please show all work neatly and orderly. All problems are to be done using rejection region(s) with the exception of the first problem.

Provide an appropriate response.

1) A fast food outlet claims that the mean waiting time in line is less than 3.8 minutes. A random sample of 60 customers has a mean of 3.7 minutes with a population standard deviation of 0.6 minute. If $\alpha = 0.05$, test the fast food outlet's claim. **Use a p-test to test the claim.**

$H_o: \mu \geq 3.8$

$H_a: \mu < 3.8$ (Claim)

$\alpha = .05$

$P = .098$

$P > \alpha \Rightarrow FTR\ H_o$ (Fail to Reject H_o)

C: Not enough evidence to support the claim that the mean waiting time is less than 3.8 min.

2) A manufacturer claims that the mean lifetime of its fluorescent bulbs is 1400 hours. A homeowner selects 25 bulbs and finds the mean lifetime to be 1390 hours with a standard deviation of 80 hours. Test the manufacturer's claim. Use $\alpha = 0.05$.

$H_o: \mu = 1400$ (claim)

$H_a: \mu \neq 1400$

$n = 25$

$\bar{x} = 1390$

$S = 80$

$\alpha = .05$

$T_c = \pm 2.064$

$T^* = -.625$

D: FTR H_o

C: There is not enough evidence to reject the claim that the mean lifetime of its bulbs is 1400 hrs.

3) An airline claims that the no-show rate for passengers is less than 5%. In a sample of 420 randomly selected reservations, 19 were no-shows. At $\alpha = 0.01$, test the airline's claim.

$H_o: p \geq .05$

$H_a: p < .05$ (claim)

$n = 420$

$x = 19$

$\hat{p} = 19/420 = .05$

$\alpha = .01$

$Z_c = -2.33$

$Z^* = -.45$

D: FTR H_o

C: There is Not enough evidence to support the claim that the no-show rate for passengers is less than 5%.

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4) Listed below is the number of tickets issued by a local police department. Assuming that the data is normally distributed, test the claim that the standard deviation for the data is 15 tickets. Use $\alpha = 0.01$.

70 48 41 68 69 55 70
57 60 83 32 60 72 58

H_0: $\sigma = 15$ (claim)
H_a: $\sigma \neq 15$

$\chi_c^2 = 3.57$ & $\chi_c^2 = 29.82$

$\chi^{2*} = 10.42$

D: FTR H_0

C: Not enough evid to reject the claim that the standard deviation for the data is 15 tickets.

5) A study was conducted to determine if the salaries of elementary school teachers from two neighboring districts were equal. A sample of 15 teachers from each district was randomly selected. The mean from the first district was $28,900 with a standard deviation of $2300. The mean from the second district was $30,300 with a standard deviation of $2100. Test the claim that the salaries from both districts are equal. Assume the samples are random and independent, and the populations are normally distributed. Also, assume that $\sigma_1^2 = \sigma_2^2$. Use $\alpha = 0.05$.

H_0: $\mu_1 = \mu_2$ (claim)
H_a: $\mu_1 \neq \mu_2$

D_1	D_2
$n_1 = 15$	$n_2 = 15$
$\bar{X}_1 = 28900$	$\bar{X}_2 = 30,300$
$S_1 = 2300$	$S_2 = 2100$

$T_c = \pm 2.048$

$\tau^* = -1.741$

D: FTR H_0

C: Not enough evid to reject the claim that the salaries from both districts are equal.

6) A weight-lifting coach claims that weight-lifters can increase their strength by taking a certain supplement. To test the theory, the coach randomly selects 9 athletes and gives them a strength test using a bench press. The results are listed below. Thirty days later, after regular training using the supplement, they are tested again. The new results are listed below. Test the claim that the supplement is effective in increasing the athletes' strength. Assume the samples are random and dependent, and the populations are normally distributed. Use $\alpha = 0.05$.

Athlete	1	2	3	4	5	6	7	8	9
Before	215	240	188	212	275	260	225	200	185
After	225	245	188	210	282	275	230	195	190

H_0: $\mu_d \geq 0$
H_a: $\mu_d < 0$ (claim)

$T_c = -1.86$

$\tau^* = -2.18$

D: Reject H_0

C: There is enough evidence to support the claim that weight lifters can increase their strength by taking a certain supplement.

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