Name Key
Date / /

+8 each
40/40

Illowsky – Chapt. 9
Larson – Chapt. 7

Provide an appropriate response.

1) Test the claim about the population μ at the level of significance α. Assume the population is normally distributed.

Claim: $\mu \le 47$; $\alpha = 0.01$; $\sigma = 4.3$
Sample statistics $\bar{x} = 48.8$, $n = 40$

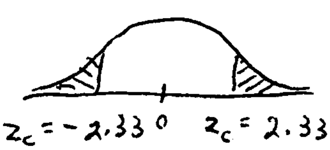
$H_0: \mu \le 47$ (claim)
$H_a: \mu > 47$
$\alpha = .01$ $\bar{x} = 48.8$
$\sigma = 4.3$ $n = 40$

$p = .004 \le \alpha = .010 \Rightarrow$ D: Reject H_0

C: At a 1% LOS, there is enough evidence to reject the claim.

2) A local brewery distributes beer in bottles labeled 32 ounces. A government agency thinks that the brewery is cheating its customers. The agency selects 50 of these bottles, measures their contents, and obtains a sample mean of 31.7 ounces with a population standard deviation of 0.70 ounce. Use a 0.01 significance level to test the agency's claim that the brewery is cheating its customers.

$H_0: \mu = 32$ (claim)
$H_a: \mu \ne 32$
$n = 50$
$\bar{x} = 31.7$
$\sigma = .70$
$\alpha = .01$



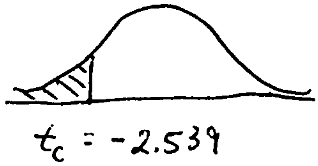
$$z^* = \frac{31.7 - 32}{.70/\sqrt{50}} = -3.03$$

D: Reject H_0

C: At a 1% LOS, there is enough evidence to reject the claim that the brewery is cheating its customers.

3) The Metropolitan Buys Company claims that the mean waiting time for a bus during rush hours is less than 5 minutes. A random sample of 20 waiting times has a mean of 3.7 minutes with a standard deviation of 2.1 minutes. At $\alpha = 0.01$, test the bus company's claim. Assume the distribution is normally distributed.

$H_0: \mu \ge 5$
$H_a: \mu < 5$ (claim)
$n = 20$
$\bar{x} = 3.7$
$s = 2.1$
$\alpha = .01$



$$t^* = \frac{3.7 - 5}{2.1/\sqrt{20}} = -2.77$$

D: Reject H_0

C: At the 1% LOS, there is enough evidence to support the claim that the mean waiting time is less than 5 minutes.

4) A telephone company claims that 20% of its customers have at least two telephone lines. The company selects a random sample of 500 customers and finds that 88 have two or more telephone lines. If $\alpha = 0.05$, test the company's claim using critical values and rejection regions.

$H_0: p = .20$ (claim)

$H_a: p \neq .20$

$n = 500$

$x = 88$

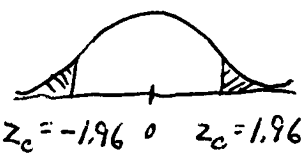
$\hat{p} = \frac{88}{500} = .176$

$q = .80$

$\alpha = .05$

$np = 100$ ✓

$nq = 400$ ✓



$$z = \frac{.176 - .20}{\sqrt{\frac{(.2)(.8)}{500}}} = -1.34$$

$\Downarrow$

D: FTR H_0

C: At a 5% LOS, there is not enough evidence to reject the claim that 20% of its customers have at least two telephone lines.

5) A local bank needs information concerning the standard deviation of the checking account balances of tis customers. From previous information it was assumed to be \$250. A random sample of 61 accounts was checked. The standard deviation was \$286.20. At $\alpha = 0.01$, test the bank's assumption. Assume that the account balances are normally distributed.

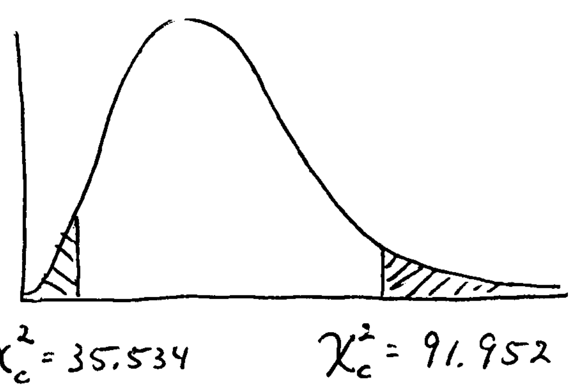
$H_0: \sigma = 250$ (claim)

$H_a: \sigma \neq 250$

$n = 61$

$s = 286.20$

$\alpha = .01$



$$\chi^2 = \frac{(60)(286.20)^2}{(250)^2} = 78.634 \Rightarrow \text{D: FTR } H_0$$

C: At a 1% LOS, there is not enough evidence to reject the claim that the standard deviation is 250.