MGS-9920

Homework-9

(15) (a) $H_0 : \mu = 1056$

$H_A : \mu \leq 1056$

(15) (b) $\bar{x} = 910$, $n = 400$

$\sigma = 1600$

Computing the z-value from the given value :

$$z = \frac{\bar{x} - \mu}{\sigma / \sqrt{n}} = \frac{910 - 1056}{1600 / \sqrt{400}} \approx -1.83$$

Computing the p-value for the one-tailed test ,

$$\begin{aligned} \text{p-value} &= P(Z \geq |z|) \\ &= P(Z \geq 1.83) \\ &= P(Z \leq -1.83) \\ &= \text{NORMSDIST}(-1.83) \\ &= 0.033625 \approx 0.0336 \end{aligned}$$

Therefore, the p-value of the test is $\boxed{0.0336}$

(15) (c) Level of Significance, $\alpha = 0.05$

Decision Rule : Reject H_0 if p-value < 0.05

Decision : p-value of test = 0.0336 which is less than the level of significance or 0.05. Thus, Reject the H_0 at the 5% significance level.

CONCLUSION : Yes, conclude that the population mean refund for 'last minute' filers is less than the population mean refund for early filers.

(15) (d) At $\alpha = 0.05$, the one-tailed tabulated value from the z-table = $z_{0.05} = 1.645$

Thus, for the left-tailed test, the critical value of test = -1.645

(20) (a) Null Hypothesis $H_0 : \mu \geq 32.79$
Alternate Hypothesis $H_A : \mu < 32.79$

(20) (b) Test Statistic
(μ) Population Mean = 32.79
(x) Sample Mean = 30.63
(s.d) Standard Deviation = 5.6
n = 50

$$\text{Test Statistic } (z) = \frac{x - \mu}{(s.d/\sqrt{n})}$$

$$z = \frac{30.63 - 32.79}{5.6/\sqrt{50}}$$

$$z = -2.7274$$

$$\boxed{|z| = \pm 2.7274}$$

(20) (c) p-value : Left Tail $\rightarrow H_A : (p < -2.7274$

$$\boxed{\text{p-value} = 0.00319}$$

(20) (d) At $\alpha = 0.01$

$\Rightarrow$ Critical Value (value of z table at LOS 0.01% is 2.33)

$\Rightarrow$ But we got $|z| = 2.7274$

Hence; calculated z value > Tabular z value and thus we reject H_0

ONCLUSION : Yes, value of Sample are less than 32.79.

(31) Given Mean (u) = 47.5 \$
Mean price paid to Private (x) = 51 \$
Standard Deviation = 12 \$
Population (N) = 64

So; z test $= \dfrac{x - u}{(s.d/\sqrt{n})} = \underline{2.33}$

But actual z-value at 5% significance level is 1.96

So; | Calculated z > Actual z |

$\Rightarrow$ Alternate (H_A) hypothesis is valid

$\Rightarrow$ Atlanta Sample support the conclusion that above average rates exist for this private water syste