Conditions

A customer service manager of State Electric Co. monitors operators taking orders by phone. The average time for a phone call, in seconds, is used as one summary of the activity for the shift. The average times, for 15 persons, are

195	223	220	237	271	239	285	262
226	269	179	214	186	208	189	

a. Stating any assumption(s) you make, obtain 95% confidence interval for the population mean.

b. Test H_o: μ=207 versus H_1: μ ≠207 with α=0.05. What assumption(s) must you make to carry out this test? Determine the p-value and comment on its size.

Solution

a. An assumption is that the time for a phone call of 220 seconds is a usual average time.

Let's calculate the mean, the standard deviation and find the value of a cumulative distribution function for 95% confidence level.

$$0.95 = P(-1.96 \leq \frac{\bar{X} - \mu}{\frac{\sigma}{\sqrt{n}}} \leq 1.96)$$

Where:

$1.95 -$ the value of cumulative distribution function at a point p=0.95

$\bar{X}$- sample mean

μ – distribution mean

σ – standard deviation

n – sample size.

The confidence interval is:

$$\left(\bar{X} - 1.96\frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{X} + 1.96\frac{\sigma}{\sqrt{n}}\right)$$
$$= \left(226.8667 - 1.96\frac{33.36137}{\sqrt{15}} \leq \mu \leq 548 + 1.96\frac{33.36137}{\sqrt{15}}\right)$$

$$209.9835 \leq \mu \leq 243.7498$$

As we see,

$209.9835 \leq 220 \leq 243.7498$

b. μ=207 is out of this interval, so H0 is rejected, Ha – approved.