

**QUESTION (Textbook Page 276, Application Exercise 7.13)**

A personnel manager has found that historically the scores on aptitude tests given to applicants for entry level positions follow a normal distribution with a standard deviation of 32.4 points. A random sample of nine test scores from the current group of applicants had a mean score of 187.9 points. Based on these sample results, a statistician found for the population mean a confidence interval extending from 165.8 to 210.0 points. Find the confidence level of this interval.

**ANSWER**

Given

$$\begin{aligned}\sigma &= 32.4 \\ \bar{X} &= 187.9 \\ n &= 9 \\ UCL &= 210.0 \\ LCL &= 165.8\end{aligned}$$

$$\text{Interval Width} = W = 2(ME)$$

$$W = UCL - LCL$$

$$W = 210.0 - 165.8$$

$$W = 44.2$$

$$44.2 = 2(ME)$$

$$ME = \frac{44.2}{2} = 22.1$$

$$ME = z_{1-\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}} \Rightarrow 22.1 = z_{1-\frac{\alpha}{2}} \frac{32.4}{\sqrt{9}}$$

$$z_{1-\frac{\alpha}{2}} = \frac{22.1 \times \sqrt{9}}{32.4} = 2.04629 \approx 2.05$$

$$z_{1-\frac{\alpha}{2}} = 2.05 \Rightarrow \text{then } 1 - \frac{\alpha}{2} = 0.9798$$

$$\frac{\alpha}{2} = 1 - 0.9798 = 0.0202$$

$$\alpha = 0.0404$$

So; confidence level for this interval

$$1 - \alpha = 1 - 0.0404 = 0.9596 \Rightarrow \underline{\underline{95.96\%}}$$