

Stats Assignment

Q2) There are 100k employees in an organization. HR wants to give t-shirts to all those employees. He comes up with 500 sample data of employees in which 300 are of XL size t-shirts and 200 are of L size t-shirts to the data analyst. Find out how many XL and X size t-shirts needs to be ordered.

Soln = For XL size t-shirts -

Sample $n = 300$

Assuming, sample mean $\bar{x} = 5000$

Standard deviation $\sigma = 100$

Confidence interval C.I = 95%.

So Significance value $\alpha = 0.05$

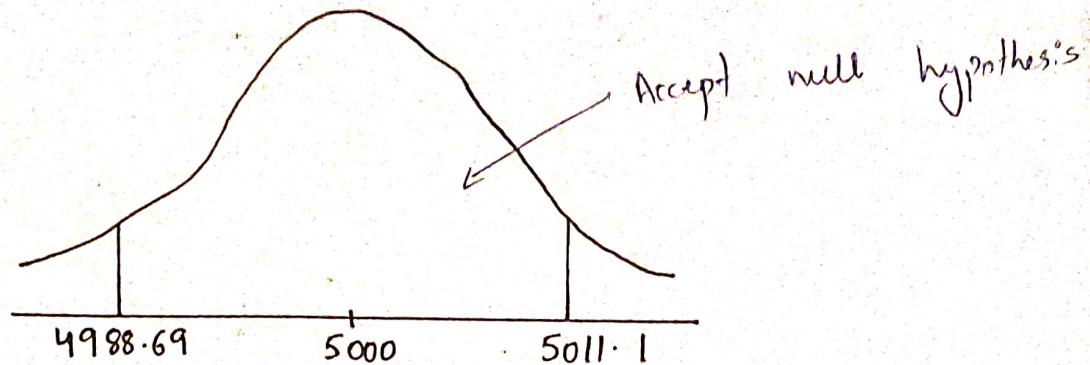
$$\therefore Z_{\alpha/2} = Z_{\frac{0.05}{2}} = Z_{0.025}$$

From Z-table, we got $Z_{0.025}$ as 1.96.

$$\begin{aligned}\therefore \text{Lower fence} &= \bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \\ &= 5000 - 1.96 \times \frac{100}{\sqrt{300}} \\ &= 4988.69\end{aligned}$$

$$\text{Higher fence} = \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

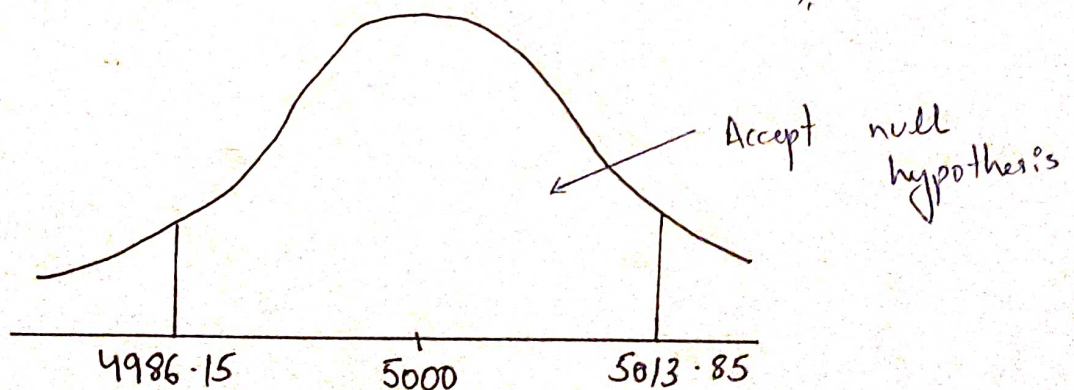
$$= 5000 + 1.96 \times \frac{100}{\sqrt{300}} = 5011.1$$



For sample $n = 200$

$$\begin{aligned} \text{Lower fence} &= \bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} = 5000 - 1.96 \times \frac{100}{\sqrt{200}} \\ &= 4986.15 \end{aligned}$$

$$\begin{aligned} \text{Higher fence} &= \bar{x} + Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} = 5000 + 1.96 \times \frac{100}{\sqrt{200}} \\ &= 5013.85 \end{aligned}$$



So 51% i.e., 51,000 XL t-shirts needs to be ordered and
 49% i.e., 49,000 L t-shirts needs to be ordered