Assignment - 5

Q-: In iNeuron there is upcoming 3rd Anniversary & Manger wants to gift the T-shirt for all his employee. It has working force of 1,00,000 employees. He has a sample data of 500 employees in which 200 ordered L-size & 300 ordered XL-size, the population standard deviation is known to be 150, with the sample mean of 450 & C.I of 95%. How many XL & L-size T-shirts he needs to order?

$\Rightarrow$ $N = 1,00,000$ $n = 500$ $\bar{x} = 450$ $C.I = 95\%$.

No. of L shirts ordered by sample data of $500 = 200$

No. of XL t-shirts ordered by sample data of $500 = 300$

Probability of L-size T-shirts on sample data $= \dfrac{200}{500} \Rightarrow 0.4 \neq 40\%$.

Probability of XL-size T-shirts on sample data $= \dfrac{300}{500} \Rightarrow 0.6 \Rightarrow 60\%$.

By Apply Sample probability of L & XL-size T-shirts on the population data.

$\therefore$ Probability of L-size T-Shirts $\Rightarrow \dfrac{40}{100} \times 100000 \Rightarrow 40,000$ T-shirts

Probability of XL-size T-shirts $\Rightarrow \dfrac{60}{100} \times 100000 \Rightarrow 60,000$ T-shirts

$\alpha = 1 - C.I$

$\alpha = 1 - 0.95$

$\alpha = 0.05$

$$Z_{\alpha/2} = Z_{\frac{0.05}{2}} \Rightarrow Z_{0.025} \Rightarrow \pm 1.96$$

Lower Fence $\Rightarrow \bar{X} - Z_{\alpha/2} \left[\frac{\sigma}{\sqrt{n}}\right]$

$$\Rightarrow 450 - 1.96\left[\frac{150}{\sqrt{500}}\right] \Rightarrow 436.85$$

$$\Rightarrow 22.36 \Rightarrow 22.4$$

Higher Fence $\Rightarrow \bar{X} + Z_{\alpha/2} \left[\frac{\sigma}{\sqrt{n}}\right]$

$$\Rightarrow 450 + 1.96\left[\frac{150}{\sqrt{500}}\right]$$

$$\Rightarrow 463.148 \Rightarrow 463.15$$

C.I range of Sample data $\Rightarrow$ Higher Fence - Lower Fence

$$\Rightarrow 463.15 - 436.85$$

$$\Rightarrow 26.3$$

∴ Lower Fence of L-Size T-Shirt $\Rightarrow 40,000 - 26.3\left(\frac{N}{n}\right) \Rightarrow 40,000 - 26.3\left(\frac{100000}{500}\right)$

$$\Rightarrow 40,000 - 5260 \Rightarrow 34,740 \text{ t-shirts}.$$

Higher Fence of L-size T-shirt $\Rightarrow 40,000 + 26.3\left(\frac{N}{n}\right) \Rightarrow 40,000 + 26.3\left(\frac{100000}{500}\right)$

$$\Rightarrow 40,000 + 5260 \Rightarrow 45,260 \text{ T-shirts}.$$

Lower Fence for XL-size T-shirt $\Rightarrow 60,000 - 26.3\left(\frac{N}{n}\right) \Rightarrow 60,000 - 26.3\left(\frac{100000}{500}\right)$

$$\Rightarrow 60,000 - 5260 \Rightarrow 54,740 \text{ t-shirts}.$$

Higher Fence for XL-size T-shirt $\Rightarrow 60,000 + 26.3\left(\frac{N}{n}\right) \Rightarrow 60,000 + 26.3\left(\frac{100000}{500}\right)$

$$\Rightarrow 60,000 + 5,260 \Rightarrow 65,260 \text{ t-shirts}$$

∴ XL-size T-shirts he should order ordered Between

54,740 to 65,260

∴ L-size T-shirts he should ordered between

34,740 to 45,260