

Q2:

In a company there are 100k employees. How many L-Tshirts and XL-Tshirts are needed if the sample data given is 500 and sample mean for XL is 800 and sample mean for L is 200?

Given:

$$n = 500$$

$$\text{For XL, } \bar{x} = 800$$

$$\text{For L, } \bar{x} = 200$$

Let's say:

$$C.I. = 95\% = 0.95$$

$$\sigma = 1000$$

$$\alpha = 1 - C.I.$$

$$\alpha = 1 - 0.95$$

$$\alpha = 0.05$$

Since we assume the population std. we go for Z-test.

Z-test

Point Estimate  $\pm$  Margin of error

$$\bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

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

$$= 1 - 0.025$$

$$= 0.975$$

$$Z\text{-value} = 1.96$$

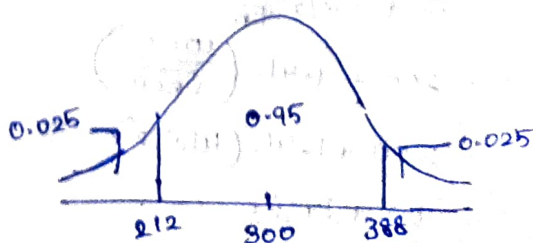
Lower Fence: [For XL]

$$\bar{x} - Z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$300 - 1.96 \left( \frac{1000}{\sqrt{500}} \right)$$

$$= 300 - 1.96 (44.72)$$

$$= 300 - (87.65)$$



$$= 212.35$$

$$\approx 212$$

Higher Fence:

$$\bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 800 + 1.96 \left( \frac{1000}{\sqrt{500}} \right)$$

$$= 800 + 1.96 (44.72)$$

$$= 800 + 87.65$$

$$= 887.65$$

$$\approx 388$$

The population mean ( $\mu$ ) for XL lie between 212 and 388

Lower Fence (For L):

$$\bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

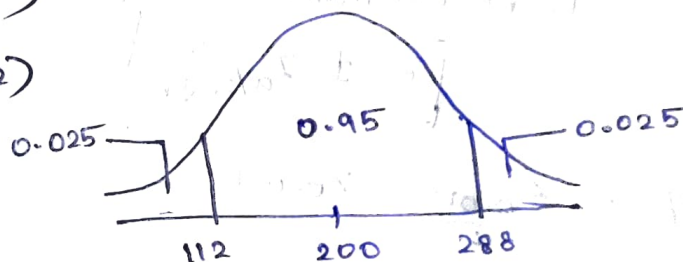
$$= 200 - 1.96 \left( \frac{1000}{\sqrt{500}} \right)$$

$$= 200 - 1.96 (44.72)$$

$$= 200 - 87.65$$

$$= 112.35$$

$$\approx 112$$



Higher Fence:

$$\bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 200 + 1.96 \left( \frac{1000}{\sqrt{500}} \right)$$

$$= 200 + 1.96 (44.72)$$

$$= 200 + 87.65$$

$$= 287.65$$

$$\approx 288$$

The population mean ( $\mu$ ) for L lie between 112 and 288