

Assignment

100k employees, L & XL Tshirts needs to be ordered. For sample data of 500, 300 were XL, 200 were L. $CI = 95\%$.

$$\Rightarrow n = 500, \hat{p} = \frac{300}{500} = 0.6, \hat{q} = \frac{200}{500} = 0.4$$

1) 500 is $< 5\%$ of population size.

2)

$$np(1-p) \geq 10$$

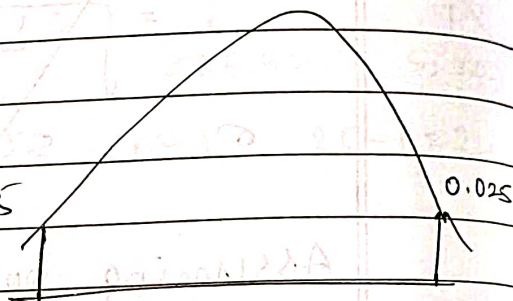
$$500(0.6)(0.4) \geq 10$$

$120 \geq 10$ \therefore it's a normal distribution

$\alpha = 0.05$, 2 Tail test.

$$\alpha/2 = 0.025$$

$$\text{Limits} = \hat{p} \pm Z_{\alpha/2} \sqrt{\frac{\hat{p}(1-\hat{p})}{n}}$$



$$\text{Higher limit} = 0.6 + Z_{0.025} \sqrt{\frac{(0.6)(0.4)}{500}}$$

$$= 0.6 + 1.96 (0.0219)$$

$$= 0.643$$

$$\text{Lower proportion} = 0.6 - 1.96 \times 0.0219$$

$$= 0.557$$

XL within 55.7% & 64.3%

$$55707 < XL < 64300$$

$$\cancel{35700} \quad \cancel{44300} \geq L \geq \cancel{35700}$$

$$L \text{ within } = 0.4 \pm 1.96 (0.0219) \text{ \& } 0.4 \pm 1.96 \left(\frac{0.0}{219} \right)$$

$$0.357 \text{ \& } 0.442$$

$$L \text{ size tshirts} = 35.7\% \text{ \& } 44.2\%$$