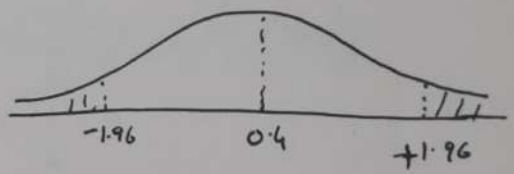
6) In an organization, HR wants to gift T-shirts to 100k employees of sizes: L & XL. As a Data Analyst, HR gives you sample of 500 employees with T-shirt size: 300 L & 200 XL. Calculate 95% CI to find out number of T-shirts to be ordered for both the sizes.

Soln: i) For XL T-shirts,

$n = 500$, $x = 200$, $\hat{p} = \frac{200}{500} = 0.4$

Assuming standard deviation $s = 1$, $\alpha = 0.05$

$Z_{\alpha/2} = \pm 1.96$



$CI = \hat{p} \pm Z_{\alpha/2} \frac{s}{\sqrt{n}} = 0.4 \pm 1.96 \times \frac{1}{\sqrt{500}}$

$= [0.31234, 0.48765]$

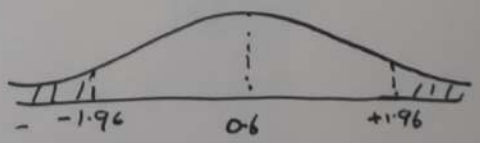
Multiply by 100k to find out the no. of orders for XL tshirts.

$= [0.31234, 0.48765] \times 100k = \boxed{[31234, 48765]}$

ii) For L Tshirts.

$n = 500$, $x = 300$, $\hat{p} = \frac{300}{500} = 0.6$, Assuming $s = 1$

$\alpha = 0.05$, $Z_{\alpha/2} = \pm 1.96$



$CI = \hat{p} \pm Z_{\alpha/2} \frac{s}{\sqrt{n}}$

$= 0.6 \pm 1.96 \times 1/\sqrt{500} = [0.51235, 0.68765]$

Multiply by 100k to find out number of orders for L T-shirts

$= [0.51235, 0.68765] \times 100k = \boxed{[51235, 68765]}$