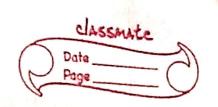Company wants to buy t-shirts for 100k employees.

For 500 employees if 800 XL & 200 L the calculate how many XL & L shirts should be ordered for 100 K employees

⟹ Formula for Confidence Interval for Proportion

$$\hat{P} \pm Z \sqrt{\frac{\hat{P}(1-\hat{P})}{n}}$$

Will assume CI = 95%

$\alpha = 0.05$, $n = $ sample size 500

$\hat{P} = \dfrac{300}{500} = 0.6$ (for XL shirts)

$$0.6 \pm 1.96 \sqrt{\frac{(0.6)(0.4)}{500}}$$

Lower fence $= 0.6 - 1.96 \sqrt{\dfrac{0.6 \times 0.4}{500}}$

$= 0.557$

Higher fence $= 0.6 + 1.96 \sqrt{\dfrac{0.6 \times 0.4}{500}}$

$= 0.643$

∴ for 100 K employees the confidence Interval for XL shirts will be

$0.557 \times 100 K$ $0.643 \times 100 K$

[$55,700$ ⟵⟶ $64,300$] XL

Using this, the portion of L shirts can be calculated as $1 - 0.557 = 0.443$

$1 - 0.643 = 0.357$ i.e.

[$35,700$ ⟵⟶ $44,300$] L

[We can also calculate it using formula]
[For L shirts like XL]

This means if the company wants to buy shirts for 100k employees they can buy

[
between 55700 to 64300 XL shirts

between 35700 to 44,300 L shirts

with 95% confidence Interval.
]