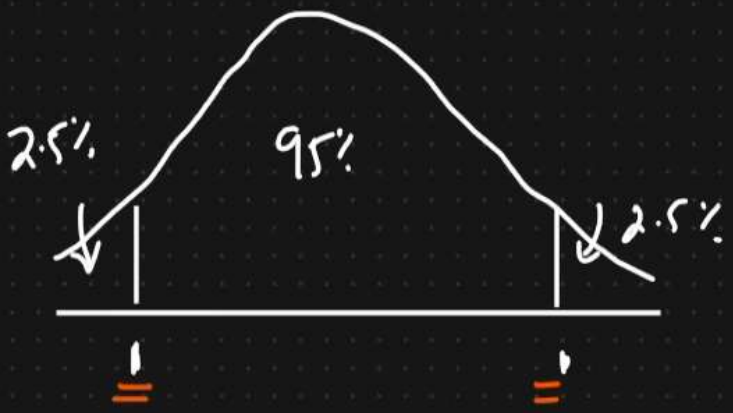
Confidence Intervals and Margin of Error



C.I = 95%

2 4

Point Estimate

$\bar{x}$ → μ

$\bar{x} = 2.5$

$\mu = 3$

Confidence Interval

Point Estimate $\pm$ Margin of Error

Confidence Interval

Point Estimate $\pm$ Margin of Error

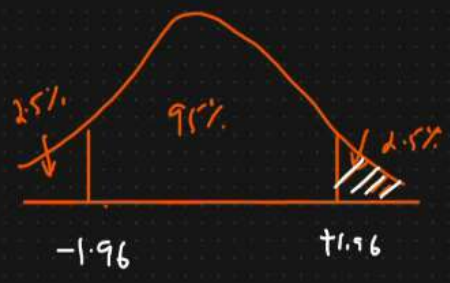
Z test $\Rightarrow$

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

Eg: On the verbal section of CAT exam, the standard deviation is known to be 100. A sample of 30 test takers has a mean of 520. Construct 95% C.I about the mean.

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

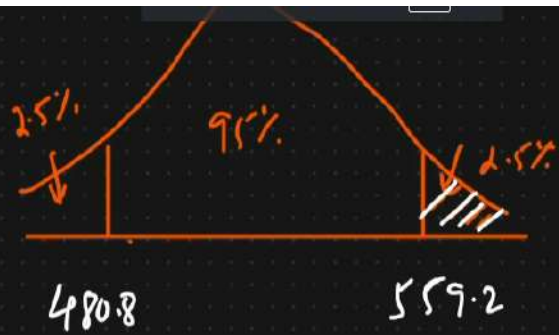
$\alpha = 0.05$



$1 - 0.025 = 0.9750$

$\pm 1.96 \Rightarrow Z$ table

lower C.I $= 520 - (1.96) \frac{100}{\sqrt{25}} = 480.4$



$\pm 1.96 \Rightarrow$ Z table

$$\text{lower C.I} = 520 - (1.96)\frac{100}{\sqrt{25}} = 480.8$$

$$\text{Higher C.I} = 520 + (1.96)\frac{100}{\sqrt{25}} = 559.2$$

Lower C.I $= 520 - (1.96)\dfrac{100}{\sqrt{25}} = 480.8$

Higher C.I $= 520 + (1.96)\dfrac{100}{\sqrt{25}} = 559.2$

Conc: I am 95% confident about the mean CAT score is between 480.8 and 559.2.