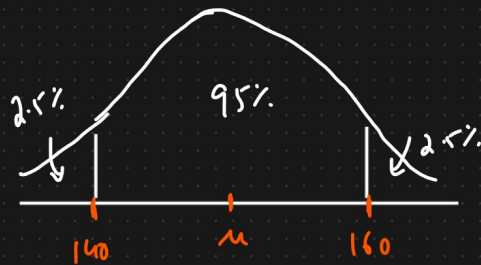


Confidence Intervals and Margin of Error

$$\mu = 160$$



$$C.I = 95\%$$

$$140 \longleftrightarrow 160$$

Point Estimate : A value of any statistics that estimates the value of an unknown population parameter is called Point Estimate

$$\begin{array}{ccc} \bar{x} & \longrightarrow & \mu \\ \bar{x} = 2.95 & & \mu = 3 \end{array}$$

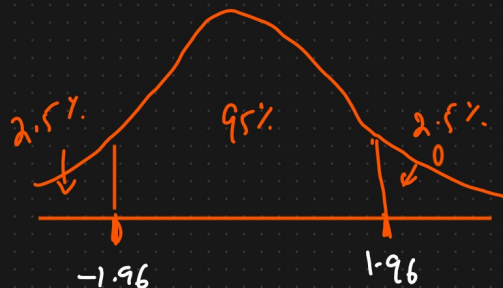
Confidence Interval

We construct a confidence interval to help estimate what the actual value of the unknown population mean is.

$$\text{Point Estimate} \pm \text{Margin of Error}$$

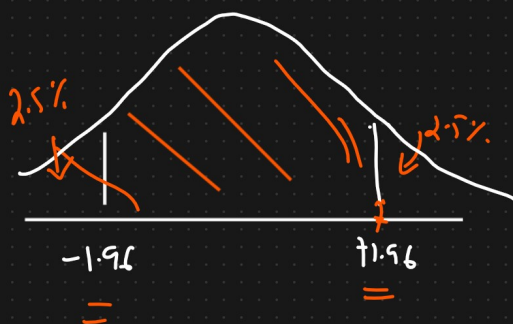
$$Z_{test} \quad \bar{x} \pm Z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \quad \alpha = 0.05$$

$$Z_{0.05/2} \Rightarrow Z_{0.025}$$



① On the Verbal section of CAT Exam, the standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct a 95% C.I about the mean?

Ans) $\bar{x} = 520$ $\sigma = 100$ $n = 25$ C.I = 0.95 $\alpha = 0.05$

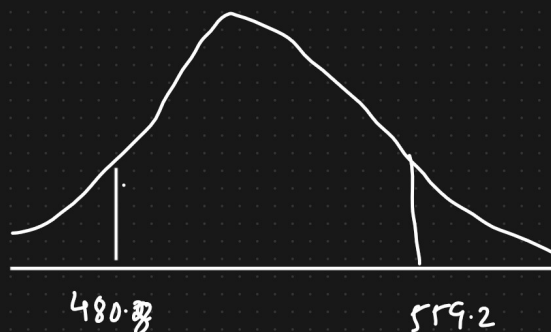


$$1 - 0.05 = 0.95$$

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

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

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



I am 95% confident that the mean CAT score lies
between 480.8 and 559.2.