

- (2) In a quant test of CAT exam, the population standard deviation is 100. A sample of 25 test takers has a mean of 520. Construct a 80% CI about the mean.

Sol: Given data:

$$\sigma = 100$$

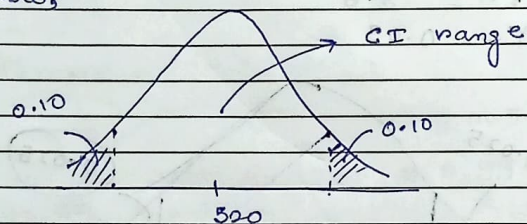
$$\text{samples } (n) = 25$$

$$\text{sample mean } (\bar{x}) = 520$$

$$CI = 80\% = 0.80$$

$$\text{Significance value } (\alpha) = 1 - CI = 0.20$$

Now,



$$\text{Margin of error} = z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$z_{\alpha/2} = z_{0.05}$$

$$\text{Area of the body} = 1 - 0.05 = 0.95$$

$$\therefore z_{\alpha/2} \text{ is from } z \text{ table;} = 1.65$$

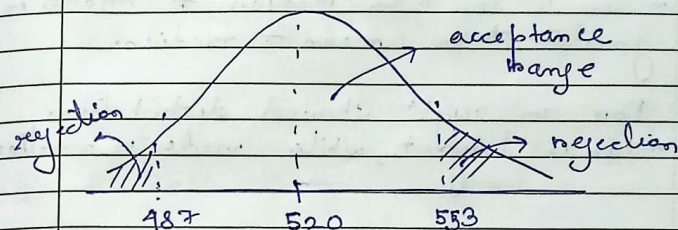
$$\therefore \text{Lower fence} = \bar{x} - z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 - 1.65 \times \frac{100}{5} = 487$$

$$\text{Higher fence} \Rightarrow \bar{x} + z_{\alpha/2} \frac{\sigma}{\sqrt{n}}$$

$$= 520 + 1.65 \times \frac{100}{5}$$

$$= 553$$



- (4) What is the value of 99th percentile?

$$\text{dataset} : \{2, 2, 3, 4, 5, 5, 5, 6, 7, 8, 8, 8, 8, 9, 9, 10, 11, 11, 12\}$$

$$n \text{ of data} = 20$$

$$\begin{aligned} 99 \text{ percentile} &= \frac{99}{100} \times (n+1) \\ &= \frac{99}{100} \times 21 = 20.79 \end{aligned}$$

Since there are 20 data, 20.79 index is the last datapoint = 12.