

Statistics Assignment

Q2: In a quant test of the CAT Exam, the population standard deviation is known to be 100. A sample of 25 tests taken has a mean of 520. Construct an 80% CI about the mean.

Ans:

Q(2):

$$\sigma = 100 \quad n = 25 \quad \bar{x} = 520 \quad CI = 80\%$$
$$\alpha = 1 - 80\% = 0.2$$
$$H_0 \Rightarrow \mu = 520$$
$$H_1 \Rightarrow \mu \neq 520$$
$$\bar{x} \pm Z_{\alpha/2} \left(\frac{\sigma}{\sqrt{n}} \right)$$
$$\text{Lower fence} = 520 - (1.282) \left(\frac{100}{\sqrt{25}} \right)$$
$$= 494.36$$
$$\text{Higher fence} = 520 + (1.282) \left(\frac{100}{\sqrt{25}} \right)$$
$$= 545.64$$
$$\text{Range} = [494.36 \longleftrightarrow 545.64]$$

Value between this value Accept the null hypothesis and Reject Alternate hypothesis.

$$= H_0 = \{ \mu = 520 \} \text{ Accept the null}$$
$$H_1 = \{ \mu \neq 520 \} \text{ Reject the Alternate.}$$