# Statistics Assignment 3

**Problem Statement:**

In the Quant test of CAT exam, the population standard deviation is known to be 100. A sample of 25 test takers has a mean of 520. Construct an 80% Confidence Interval about the mean

**Solution:**

Since we have been given the Population Standard deviation we can make use of the Z-Score Table to solve this problem.

Population Standard Deviation = 100

Sample Mean = 520

Sample Size = 25

Since we need to find an 80% Confidence Interval about the mean we can determine the significance value as 1 – (80/100) = 1 – 0.8 = 0.2

Since the distribution is symmetric, we have 0.1 on both sides of the curve.

A picture containing diagram

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The Lower Fence of the Confidence Interval can be calculated using the below formula

Lower Fence = Point Estimate – Z (α/2) \* (σ/ sqrt(n))

Here the Point Estimate is the Sample Mean = 520

α is the Significance value = 0.2

We need to find the Z score for 0.1

We can find it by subtracting 1 from 0.1 i.e., 0.9. We need to find the Z value corresponding to area value of 0.9.

The value is determined to be 1.28. Since it is symmetric for the negative side it will be – 1.28.

Table

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Lower Fence = Point Estimate – Z (α/2) \* (σ/ sqrt(n))

= 520 – 1.28 \* (100 / sqrt (25))

= 520 – 1.28 \* 20

= 494.4

The Upper Fence of the Confidence Interval can be calculated using the below formula

Upper Fence = Point Estimate + Z (α/2) \* (σ/ sqrt(n))

= 520 + 1.28 \* (100 / sqrt (25))

= 520 + 1.28 \* 20

= 545.6

Given below is the Distribution with the 80% confidence interval values.

Diagram

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