

Answer on Question #41885 – Math - Statistics and Probability

In a random sample of 40 felons convicted of aggravated assault, it was determined that the mean length of sentencing was 54 months, with a standard deviation of 8 months. Construct and interpret a 95% confidence interval for the mean length of sentence for an aggravated assault conviction.

Solution:

Sample size $n = 40$ (large sample)

Sample mean $\bar{x} = 54$

Standard deviation $\sigma = 8$.

$\gamma = 0.95$ – confidence probability

Since $1 - \alpha = 0.95$, $\alpha/2 = 0.025$, and $z_{0.025} = 1.96$, the large sample 95% confidence interval for μ becomes $\left(\bar{x} - z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}; \bar{x} + z_{\frac{\alpha}{2}} \frac{\sigma}{\sqrt{n}}\right) = \left(54 - 1.96 \frac{8}{\sqrt{40}}; 54 + 1.96 \frac{8}{\sqrt{40}}\right) = (51.52; 56.48)$.

This means that we can be 95% confident that the mean length of sentencing is in the interval 51.52 to 56.48 months.