Answer on Question #72121 – Math – Statistics and Probability

Question

A random sample of 100 record shops found that the average weekly sale of a particular record was 260 copies with standard deviation of 96. Find the 95% confidence interval to estimate the true average sale for all shops.

Solution

When the population standard deviation is known (and $n > 30$), the formula for a confidence interval (CI) for a population mean is

$$\overline{x} \pm z^* \frac{\sigma}{\sqrt{n}},$$

where $\overline{x}$ is the sample mean, σ is the population standard deviation.

1. Determine the confidence level and find the appropriate z*-value.

Confidence level	z*-value
95%	1.96

2. It is given that $\overline{x} = 260, \sigma = 96, n = 100$.

3. Find the 95% confidence interval to estimate the true average sale for all shops

$$260 \pm 1.96 \frac{96}{\sqrt{100}} = 260 \pm 18.816.$$

The lower end of the interval is

$$260 - 18.816 = 241.184;$$

the upper end is

$$260 + 18.816 = 278.816.$$

Answer: $(241.184,\ 278.816)$.