Conditions

What is the confidence interval for the population mean assuming the population has a normal distribution and n=12, x=29.5, s=4.1, and 99% confidence

Solution

$$\mathbb{P}\left(\bar{X} - z_{\frac{1-\alpha}{2}}\frac{\sigma}{\sqrt{n}} \leq \mu \leq \bar{X} + z_{\frac{1-\alpha}{2}}\frac{\sigma}{\sqrt{n}}\right) = \alpha$$

$z_{0,99} = 2,326$

$$29.5 - 2.326 \cdot \frac{4.1}{\sqrt{12}} \leq \mu \leq 29.5 + 2.326 \cdot \frac{4.1}{\sqrt{12}}$$

$$24.747 \leq \mu \leq 32.253$$

Answer: $\mathbf{24.747 \leq \mu \leq 32.253}$