

Answer on Question #46537 – Math – Statistics and Probability

Problem.

Metal conduits or hollow pipes are used in electrical wiring. In testing 1-inch pipes, these data are obtained on the outside diameter (in inches) of the pipe: 1.21, 1.19, 1.20, 1.22, 1.18, 1.23, 1.17, 1.09. Assume that sampling is from normal distribution with mean and variance .

i. Find unbiased estimates for μ and σ^2 .

ii. Find 95% confidence interval on the mean outside diameter of pipes of this type.

Remark: The part of question is missed. I suppose that the correct statement is

“Metal conduits or hollow pipes are used in electrical wiring. In testing 1-inch pipes, these data are obtained on the outside diameter (in inches) of the pipe: 1.21, 1.19, 1.20, 1.22, 1.18, 1.23, 1.17, 1.09. Assume that sampling is from normal distribution with mean μ and variance σ^2 .

i. Find unbiased estimates for μ and σ^2 .

ii. Find 95% confidence interval on the mean outside diameter of pipes of this type.”

(see http://www.bits-pilani.ac.in/uploads/ReadPDFDOC/AAOC_C111_515_C_2009_2.doc)

Solution:

i. Unbiased estimate for μ equals $\bar{x} = \frac{1.21+1.19+1.20+1.22+1.18+1.23+1.17+1.09}{8} = 1.18625$.

Unbiased estimate for σ^2 equals $s^2 = \frac{1}{7}((1.21 - \bar{x})^2 + (1.19 - \bar{x})^2 + (1.20 - \bar{x})^2 + (1.22 - \bar{x})^2 + (1.18 - \bar{x})^2 + (1.23 - \bar{x})^2 + (1.17 - \bar{x})^2) = 0.0019125$.

Answer: $\bar{x} = 1.18625, s^2 = 0.0019125$

ii. For 95% confidence interval $z^* = 1.96$.

The confidence limits for the population mean are equal $\mu \pm z^* \cdot \sigma$ or 1.1825015 and 1.1899985. The 95% confidence interval is (1.1825015,1.1899985).

Answer: (1.1825015,1.1899985).