Answer on Question #76542 – Math – Statistics and Probability

Question

Suppose a randomly selected sample of n = 70 men has a mean foot length of x = 27.1 cm, and the standard deviation of the sample is 2 cm. Calculate an approximate 95% confidence interval for the mean foot length of men.

Solution

The endpoints of the approximate 95% confidence interval are

$$\bar{X} \pm z\frac{\sigma}{\sqrt{n}},$$

where $\bar{X}$ is the sample mean, σ is the standard deviation of the sample,

$$z = \Phi^{-1}\left(1 - \frac{\alpha}{2}\right) = \Phi^{-1}(0.975) = 1.96.$$

Here $\alpha = \frac{1-0.95}{2} = 1.25$, Φ is the cumulative normal distributed function.

We get that the confidence interval is

$$\left(27.1 - 1.96\frac{2}{\sqrt{70}}, 27.1 + 1.96\frac{2}{\sqrt{70}}\right),$$

$$(26.6316, 27.5684).$$

Answer: $(26.6316, 27.5684)$.