Answer on Question #65161 – Math – Statistics and Probability

Question

If the results of 100 observations, which had a standard deviation of 0.5, were gathered randomly into groups of 10 and the mean of each group recorded, what would you expect to be the value of the standard deviation of the group of means thus produced?

Solution

The standard deviation [1] is given by

$$\sigma = \sqrt{\frac{1}{N}\sum_{i=1}^{N}(x_i - \mu)^2}.$$

So if samples with standard deviation of 0.5 were gathered randomly into groups of 10 and the mean of each group recorded, the value of the standard deviation of the group of means thus produced will be greater in $\sqrt{10}$ times, i.e.

$$\sigma = 0.5\sqrt{10} \approx 1.58.$$

Answer: 1.58.

Reference:

[1] Standard deviation. Retrieved from https://revisionmaths.com/gcse-maths-revision/statistics-handling-data/standard-deviation