

Answer on Question #51152 – Math – Statistics and Probability

2. A screw manufacturer makes specialized tiny screws that are 15mm long. The manufacturing process does not make every screw exactly 15mm long. If the lengths of the screws are normally distributed with population mean $\mu = 15mm$ and population standard deviation $\sigma = 0.04mm$. To test for quality control, 100 screws are to be measured. What is the distribution of the sample means for samples of size $n = 100$?

3. A screw manufacturer makes specialized tiny screws that are suppose to be 15mm long. The manufacturing process does not make every screw exactly 15mm long. The lengths of the screws are normally distributed with population standard deviation 0.04mm. A quality control manager thinks that the screws being made actually have mean lengths longer than 15mm. What is her null hypothesis and alternative hypothesis for testing this belief?

Solution

2. The distribution of the sample means is the normal distribution with mean

$$\mu_M = \mu = 15mm$$

and the standard deviation

$$\sigma_M = \frac{\sigma}{\sqrt{n}} = \frac{0.04mm}{\sqrt{100}} = 0.004mm.$$

3. $H_0: \mu = 15mm; H_a: \mu > 15mm.$

The null hypothesis: The manufacturing process makes screw with mean lengths exactly 15mm long.

The alternative hypothesis: The screws being made actually have mean lengths longer than 15mm.