Answer on Question #60640 – Math – Statistics and Probability

Question

If μ equals 42, what percentage of all possible sample means are greater than or equal to 42.95? Since we have actually observed a sample mean of Picture = 42.95, is it more reasonable to believe that (1) μ equals 42 and we have observed a sample mean that is greater than or equal to 42.95 when μ equals 42, or (2) that we have observed a sample mean that is greater than or equal to 42.95 because μ is greater than 42? Explain. What do you conclude about whether customers are typically very satisfied with the XYZ Box video game system? (Round your answer to 2 decimal places. Do not round your intermediate calculations. Input your answer to percent without percent sign.

Solution

$$\mu = 42, \sigma = 2.64$$

$$\mu_{\bar{x}} = 42, \sigma_{\bar{x}} = \frac{2.64}{\sqrt{65}} = 0.3275$$

$$P(\bar{x} \geq 42.95) = P\left(z \geq \frac{42.95 - 42}{0.3275}\right) = P(z \geq 2.90) = P(z < -2.90)$$

From z-table: $P(z < -2.90) = 0.0019$.

So,

$$P(\bar{x} \geq 42.95) = 0.0019.$$

The percentage of all possible sample means are greater than or equal to 42.95 is 0.19%.

We reject the null hypothesis at 1% significance level because $0.0019 < 0.01$. There is very strong evidence to conclude that μ is greater than 42.

Thus, it is more reasonable to believe that we have observed a sample mean that is greater than or equal to 42.95 because μ is greater than 42.

We can conclude that customers are typically very satisfied with the XYZ Box video game system because the mean of the population of all satisfaction ratings is at least 42.