

Answer on Question #70681 – Math – Statistics and Probability

Question

A manufacturer of guitar amplifiers markets one of its models, Vagabond, at a power rating of 45 watts. GuitarGod magazine suspects that this rating is inaccurate for this year's model of the amp. In a random sample of 32 units of this year's version of the Vagabond the mean output power is 42 watts, with a standard deviation of 8 watts.

Assuming a confidence level of 95%, which of the following statements do these data support?

- A. This year's Vagabond's output power is 45 watts.
- B. This year's Vagabond's output power is 42 watts.
- C. This year's Vagabond's output power is not 45.
- D. None of the above

Solution

$$\begin{aligned} 95\%CI &= \left(\bar{x} - t_{0.025,31} \frac{s}{\sqrt{n}}, \bar{x} + t_{0.025,31} \frac{s}{\sqrt{n}} \right) = \\ &= \left(42 - 2.04 \frac{8}{\sqrt{32}}, 42 + 2.04 \frac{8}{\sqrt{32}} \right) = (39.12, 44.88) \end{aligned}$$

Since the value of 45 does not lie within this interval, this year's Vagabond's output power is not 45 watts. (C).

Value of 42 is the point estimate for the year's output, so (B).

These data support (B) and (C) .

Answer: B, C.