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Question: 1) A random sample of 50 8-ounce cups of black "Early Riser" ...

- 1) A random sample of 50 8-ounce cups of black "Early Riser" coffee dispensed by a new machine gave a mean of 11.0 mg. of caffeine. It is known from previous studies that the standard deviation for 8 oz. cups of black "Early Riser" coffee dispensed by this machine was 7.1 mg. Construct a 90% confidence interval for the mean caffeine content for cups dispensed by this machine.
- 2) The U.S Bureau of the Census conducted a survey of 5000 people and found that the mean income for a person with a bachelor's degree was \$38,973. It is known from previous studies nationwide that the standard deviation in income for a person with a bachelor's degree is \$6,340. Construct a 98% confidence interval for the mean income nationwide for persons with a bachelor's degree.
- 3) Health insurers and the federal government are both putting pressure on hospitals to shorten the average length of stay (LOS) of their patients. A random sample of 27 hospitals in one state had a mean LOS in 1998 of 3.8 days and a standard deviation of 1.2 days. Construct a 98% confidence interval to estimate the population mean of the LOS for the state's hospitals in 1998.
- 4) A random sample of 100 movie theaters showed that the mean price of a movie was \$7.00 with a standard deviation of \$.80. Construct a 99% confidence interval for the population mean.
- 5) A researcher wants to determine the 99% confidence interval for the mean number of hours per week that adults spend doing community service. How large of a sample should the researcher select so that the estimate will be within 1 hour of the population mean? Assume that the standard deviation for hours spent per week by adults doing community service is 3.

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Expert Answer



Anonymous answered this
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(1)

The provided sample mean is $\bar{X} = 11$ and the population standard deviation is $\sigma = 7.1$. The size of the sample is $n = 50$ and the required confidence level is 90%.

Based on the provided information, the critical z-value for $\alpha = 0.1$ is $z_c = 1.645$.

The 90% confidence for the population mean μ is computed using the following expression

$$CI = \left(\bar{X} - \frac{z_c \times \sigma}{\sqrt{n}}, \bar{X} + \frac{z_c \times \sigma}{\sqrt{n}} \right)$$

Therefore, based on the information provided, the 90% confidence for the population mean μ is

$$\begin{aligned} CI &= \left(11 - \frac{1.645 \times 7.1}{\sqrt{50}}, 11 + \frac{1.645 \times 7.1}{\sqrt{50}} \right) \\ &= (11 - 1.652, 11 + 1.652) \\ &= (9.348, 12.652) \end{aligned}$$

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size of the sample is $n = 5000$ and the required confidence level is 98%.

Based on the provided information, the critical z-value for $\alpha = 0.02$ is $z_c = 2.326$.

The 98% confidence for the population mean μ is computed using the following expression

$$CI = \left(\bar{X} - \frac{z_c \times \sigma}{\sqrt{n}}, \bar{X} + \frac{z_c \times \sigma}{\sqrt{n}} \right)$$


Therefore, based on the information provided, the 98 % confidence for the population mean μ is

$$\begin{aligned} CI &= \left(38973 - \frac{2.326 \times 6340}{\sqrt{5000}}, 38973 + \frac{2.326 \times 6340}{\sqrt{5000}} \right) \\ &= (38973 - 208.583, 38973 + 208.583) \\ &= (38764.417, 39181.583) \end{aligned}$$

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A teacher wants to find out whether a relationship exists



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LUTUCIC Helval IUL. (c) Interpret the confidence interval. 5. A researcher wants to determine the

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Q: Help on question 4

A: See answer

Q: A researcher wants to determine the 99% confidence interval for the mean number of hours per week that adults spend doing community service. How large of a sample should the researcher select so that the estimate will be within 1 hour of the population mean? Assume that the standard deviation for hours spent per week by adults doing community service is 3.

A: See answer 100% (1 rating)

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