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1. Wood et. al (1988) studied the efficacy of diet for losing weight. The study, which lasted one year, involved only men. The weight loss for dieting men follows a normal distribution with mean μ and standard deviation σ. A group of $n = 16$ dieting men lost an average of $\bar{x} = 7.2$ pounds with standard deviation $s = 4.4$ pounds.

   (a) Find a 90% confidence interval for μ.

   (b) Based upon your answer in (1a), does the population mean weight loss μ significantly differ from 5.5 pounds? Why?

   (c) Based upon your answer in (1a), is 8 a plausible value for μ? Why?

   (d) Based upon your answer in (1a), is 5 a plausible value for μ? Why?

2. The amount of time per day (in hours) office workers spend working on a computer can be modeled by a normal distribution with mean μ and standard deviation σ. A manager wants to infer about the population mean μ, so he randomly selects 5 employees and observes their computer time over the course of a day. The raw data is:

$$6.5, \ 7.1, \ 5.9, \ 6.2, \ 6.3$$

   (a) Compute the sample mean $\bar{x}$ and the sample standard deviation s.

(b) Find a 99% confidence interval for μ.

(c) Based upon your answer in (2b), does the population mean time μ significantly differ from 7 hours? Why?

(d) Based upon your answer in (2b), does the population mean time μ significantly differ from 8 hours? Why?

3. The longevity of IV pumps (in months) has a normal distribution with mean μ months and standard deviation $\sigma = 8.0$ months. Suppose $n = 16$ IV pumps are randomly selected and the sample mean longevity $\bar{x} = 42.5$ months.

   (a) Test $H_0 : \mu = 40$ versus $H_a : \mu \neq 40$ at the $\alpha = 0.10$ significance level. *Find the test statistic and critical value, plot the rejection region, and state your decision and final conclusion.*

   (b) Based upon your answer in (3a), does the mean longevity μ significantly differ from 40 months? Why?

(c) Find a 90% CI for the mean longevity μ.

(d) Based upon your answer in (3c), will the $p-$value for the test in (3a) be less than α or greater than α? Why?

(e) Find the $p-$value for the test in (3a).

(f) Based upon your answer in (3c), does the mean longevity μ significantly differ from 55? Why?

(g) How many IV pumps would be needed for $se(\bar{x})$ to equal 1.0?

(h) Even though the sample size $n < 30$, we were able to perform the above analysis. Why?

4. The diastolic blood pressure, X, of smokers follows a normal distribution with mean μ and standard deviation $\sigma = 15$, i.e. $X \sim N(\mu, \sigma = 15)$. The diastolic blood pressure of 3 randomly selected smokers was:

<div align="center">

125 140 125

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(a) Find a 95% CI for the population mean diastolic blood pressure μ.

(b) Test $H_0 : \mu = 140$ vs. $H_a : \mu \neq 140$ at the $\alpha = 0.05$ significance level. *Find the test statistic and critical value, plot the rejection region, and state your decision and final conclusion.*

(c) Find the $p-$value for the test in 4b.

(d) Based upon your answer in (4c), does the population mean diastolic blood pressure μ significantly differ from 140? Why?

(e) Based upon your answer in (4a), does the population mean diastolic blood pressure μ significantly differ from 140? Why?