Question 3

An industrial plant dumps its waste into a nearby river, but claims that it is not impacting the native species of frogs that live in the river. The frogs are able to tolerate calcium concentrations **up to 91 mg/L**.

You measure the concentration of calcium in 25 random samples from the river. Your measurements are approximately normally distributed, with a **mean of 93.6 mg/L**, with a standard deviation of **7.8 mg/L**.

(1 point possible)

3a. What is the appropriate **alternative hypothesis** if the industrial plant's runoff is believed to be producing higher calcium concentrations than are deemed acceptable for the frogs? *Let* $\boldsymbol{\mu}$ *represent the true calcium concentration in the river downstream from the plant.*

- $\mu = 91$
- $\mu \neq 91$
- $\mu < 91$
- $\mu > 91$ ✔

Hide Answer *You have used 0 of 1 submissions*

(1 point possible)

3b. Calculate the **test statistic**. *(Round to 2 decimal places.)*

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Answer: 1.67

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(1 point possible)

3c. What is the **t-critical** value? *(Round to 3 decimal places.)*

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Answer: 1.711

Hide Answer *You have used 0 of 1 submissions*

(1 point possible)

3d. Does your data provide sufficient evidence to suggest that the calcium concentration in the river is **more than** 91 mg/L?

- Yes
- No ✔

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(1 point possible)

3e. Suppose as part of a broader investigation into the plant's impact on the river's ecosystem, an environmental group conducted a large-scale study and found that the actual mean calcium concentration level downstream from the plant is 95 mg/L. Did you make an error in your hypothesis test, and if so, what type was it?

- Yes, a Type I Error
- Yes, a Type II Error ✔
- No error was made

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