Question 3

Some nerve cells have the ability to regenerate. Researchers think that these cells may generate creatine phosphate (CP) to stimulate new cell growth.

To test this hypothesis, researchers cut the nerves emanating from the left side of the spinal cord in a sample of rhesus monkeys, while the nerves on the right side were kept intact. They then compared the CP levels (mg/100g) in nerve cells on both sides.

Monkey ID	**CP on Left Side** *(regenerating)*	**CP on Right Side** *(control)*
1	16.3	11.5
2	4.8	3.5
3	10.7	12.8
4	14.0	7.9
5	15.7	15.2

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6	9.9	9.8
7	29.3	24.0
8	20.4	14.9
9	15.7	12.6
10	7.6	8.2
11	16.2	8.4
12	14.7	11.0
13	15.0	12.5
14	8.4	9.2
15	23.3	17.5
16	17.7	11.1

(1 point possible)

3a. Which is the appropriate method for testing the researchers' hypothesis?

- Dependent t-test ✔
- Independent samples t-test
- Single sample z-test

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Assume the researchers calculated the difference scores as d = CPleft - CPright.

They set α = 0.05.

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(1 point possible)

3b. How many **degrees of freedom** are there?

Answer: 15

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(1 point possible)

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

Answer: 1.753

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(1 point possible)

3d. How much of a **difference** in creatine phosphate was observed, on average, between the left and right nerve cells? *(Report as a positive value rounded 1 decimal place).*

Answer: 3.1

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(1 point possible)

3e. What is the **Standard Deviation** of the difference scores? *(Round to 2 decimal places.)*

Answer: 3.05

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(1 point possible)

3f. What is the **Standard Error** for your t-test? *(Round to 2 decimal places.)*

Answer: .76

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(1 point possible)

3g. What is your **test statistic**? *(Round to 2 decimal places.)*

Answer: 4.06

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3h. Is there sufficient evidence to suggest that the levels of creatine phosphate are higher in regenerating cells than they are in the normal (control) cells?

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- Yes ✔
- No

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(1 point possible)

3i. The researchers finish their analysis by calculating a **95% confidence interval** for the true increase in CP levels in rejuvenating nerve cells. What are the lower and upper bounds? *(Round each to 1 decimal place.)*

Lower bound

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Answer: 1.5

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(1 point possible)

Upper bound *(Round to 1 decimal place.)*

Answer: 4.7

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