**Quiz 10, Version 1**

**Scenario: Like all of the other people staying at home, Dr. Hopkins is starting to bake to pass the time. But instead of baking bread, she is baking dog biscuits, which have just three ingredients: flour, eggs, and tuna. She wants to make enough biscuits to last her dog all week, but her first batch barely lasted one day. So she has been keeping track of how much flour she uses per batch and how many biscuits she gets out of each batch. So far, she found that 1 cup of flour yielded 20 biscuits, 2 cups of flour yielded 32 biscuits, 3 cups of flour yielded 48 biscuits, and 4 cups of flour yielded 59 biscuits.**

Q1. What kind of variable is the number of biscuits per batch?

1. Quantitative and discrete
2. Quantitative and continuous
3. Categorical/nominal
4. Ordinal

Q2. If Dr. Hopkins did a regression analysis to see if biscuit yield changes with flour input, which of these would be her null and alternative hypotheses?

1. H0: β=0

Ha: β≠0

1. H0: β≠0

Ha: β=0

1. H0: µbiscuit - µflour = 0

Ha: µbiscuit - µflour ≠ 0

1. H0: µbiscuit - µflour ≠ 0

Ha: µbiscuit - µflour = 0

Q3. If Dr. Hopkins did a regression analysis to see how biscuit yield changes with flour input, which of these would be her regression equation?

1. biscuitsi = 6.5 + 13.3\*flouri + εi
2. biscuitsi = 6.5 - 13.3\* flouri + εi
3. flouri = 6.5 + 13.3\*biscuitsi + εi
4. flouri = 6.5 - 13.3\*biscuits + εi

Q4. Dr. Hopkins does a regression analysis and finds that p=0.015. Which of these is correct?

1. Assuming α=0.05, she rejects the null hypothesis.
2. Assuming α=0.05, she fails to reject the null hypothesis.
3. Assuming α=0.05, she rejects the alternative hypothesis.
4. Assuming α=0.05, she proves the null hypothesis.

5. Which option best describes the regression analysis for biscuit yield vs. flour input?

1. The regression analysis is an example of inferential statistics based on an experiment.
2. The regression analysis is an example of descriptive statistics based on an experiment.
3. The regression analysis is an example of inferential statistics based on an observational study.
4. The regression analysis is an example of descriptive statistics based on an observational study.

6. Using the results of her regression analysis, Dr. Hopkins predicts how many biscuits she would get if she turned into one of those COVID19 flour hoarders and started using 9 cups of flour per week to make dog biscuits. Which of these statements is correct regarding her prediction?

1. Her prediction would be that she would get ~126 biscuits when using 9 cups of flour, and this is an example of extrapolation.
2. Her prediction would be that she would get ~126 biscuits when using 9 cups of flour, and this is an example of interpolation.
3. Her prediction would be that she would get ~24 biscuits when using 9 cups of flour, and this is an example of extrapolation.
4. Her prediction would be that she would get ~24 biscuits when using 9 cups of flour, and this is an example of interpolation.

**Quiz 10, Version 2**

**Scenario: In 2019, 667 dogs from 6 countries competed in a global disc competition. Each team (dog + human) was given three sixty-second turns to throw and catch as many discs as possible, and points were awarded based on distance: dogs received more points for catching discs thrown longer distances. The dogs’ total scores were the sum of their scores for each of the three rounds. There were 10 dog breeds that had more than 10 dogs competing, including border collies, Australian shepherds, and Labrador Retrievers.**

Q1. What kind of variable is dog breed?

1. Categorical/nominal
2. Quantitative discrete
3. Quantitative continuous
4. Ordinal

Q2. If you did an ANOVA analysis to see if the average total score varied by dog breed for the top ten most common dog breeds, which of these would be your null and alternative hypotheses?

1. H0: The average total score was the same for all dog breeds.

Ha: The average total score was different for at least one dog breed.

1. H0: The average total score was different for at least one dog breed.

Ha: The average total score was the same for all dog breeds.

1. H0: β=0

Ha: β≠0

1. H0: β≠0

Ha: β=0

Q3. You do an ANOVA analysis and find that p=0.63. Which of these is correct?

1. Assuming α=0.05, you fail to reject the null hypothesis.
2. Assuming α=0.05, you reject the null hypothesis.
3. Assuming α=0.05, you accept the alternative hypothesis.
4. Assuming α=0.05, you prove the alternative hypothesis.

Q4. Which option best describes the ANOVA analysis for total score and dog breed?

1. The ANOVA analysis is an example of inferential statistics based on an observational study.
2. The ANOVA analysis is an example of inferential statistics based on an experiment.
3. The ANOVA analysis is an example of descriptive statistics based on an experiment.
4. The ANOVA analysis is an example of inferential statistics based on an observational study.

Q5. What kind of plot would be best to visualize how the total score for each dog varied by dog breed?

1. A box-and-whisker plot with the individual data points overlain
2. A bubble plot
3. A pie chart
4. A line plot

Q6. Why would we only include the top ten most common dog breeds in the ANOVA analysis?

1. The sample sizes for the uncommon dog breeds were too small to provide adequate statistical power to detect significant effects, if they existed.
2. You cannot do an ANOVA analysis with more than 10 groups.
3. The top ten most common dog breeds were the fastest, so it was best to only look at those ten breeds.
4. The top ten most common dog breeds scored this highest, so it was best to only look at those ten breeds.