Quiz 1

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1. Provide an intuitive interpretaion of a P-value (as in the NHST framework).

2. Suppose $\hat{\theta} \pm \epsilon$ is a 95% confidence interval for the parameter θ. Write a correct interpretation of the confidence interval that would be understandable to a non-expert.

3. Matrix A is invertible.

a. What can be said about $\det(A)$, the determinant of A?

b. What can be said about the eigenvalues of A?

4. Write out the four usual assumptions of linear regression.

5. Explain why applying a z-test in place of a t-test risks inflating the Type I error.

6. A study is being conducted on the effects of fish oil supplementation on memory. A sample of $n = 99$ individuals are randomly assigned to one of three groups: Low Dose, High Dose, Control. After 6 weeks individuals take a memory exam and their scores (out of 100) are recorded.

a. Write, in 'plain English', the null and alternative hypotheses that would be most appropriate given the above setup.

b. Can you identify any potential flaws with the study design? How might you improve the study design?

c. What model/method would you choose?