Final Exam Questions

Some of these questions will be on the final exam.

- 1. What is the difference between a statistic and a parameter?
- 2. The concept of p-value is one of the central ideas of statistical inference. P-values can be calculated from many different probability distributions (e.g., normal, t, and χ^2). Discuss the definition of p-value and explain why it is so universal for hypothesis testing in statistics.
- 3. Why is random sampling important?
- 4. Why are large samples better than small samples?
- 5. Explain the difference between sample bias and random error.
- 6. Use the Central Limit Theorem to explain how the sampling distribution for \bar{x} changes as the sample size N gets larger. Explain two key differences.
- 7. Discuss the difference between an experiment and an observational study. Why would anyone go to the extra trouble of doing an experiment?
- 8. When we find a 95% confidence interval for a parameter, what are we 95% sure is true?
- 9. Discuss the similarities and differences between the t-distribution and the z-distribution.
- 10. What is the Law of Large Numbers, and what does it have to do with gambling in a Las Vegas casino?
- 11. Explain the difference between explanatory, response, and lurking variables.
- 12. We say that 'correlation doesn't imply causation'. Why doesn't an observed association or correlation imply a causal relationship between two variables?