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 the difference between the sampling distribution for x and $\bar{x}$. 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?