

NAME (Please Print): _____

HONOR PLEDGE (Please Sign): _____

statistics 101

Practice Final

This is a multiple choice and short answer practice exam. It does not count towards your grade.

You may use the tables in your book.

1. True or False:

_____ For a t-test of the slope in a regression, the degrees of freedom should be the sample size.

_____ William Gosset invented the t-test.

_____ The P-value is a measure of how improbable the data are if the null is true.

_____ The Belmont Report described ethical principles for animal studies.

_____ As the confidence level increases, so does the width of the confidence interval.

_____ The apparent gender discrimination in the Berkeley admissions program is an example of Simpson's paradox.

_____ Randomization prevents confounding in an observational study.

2. Suppose that people's heights are normally distributed with standard deviation 5 inches. How large a sample size do you need to ensure that a two-sided 95% confidence interval has width less than 1 inch?

3. What is the significance probability of a test?

4. For each of 200 M&M's in a pack, Aristides has probability $1/10$ of eating it and probability $9/10$ of putting it in his pocket.

What is the approximate probability that Aristides eats more than 15 M&M's?

5. Midterm scores from a class of 100 people have mean 85 and standard deviation 9.

What is the probability that Bucephalus got less than 88?

What is the probability that Cassandra got between 80 and 95?

6. You observe the following random sample:

3, -1, 0, -1, 1, 2

What is the sample mean?

What is the median?

What is the standard deviation?

What is a 90% two-sided confidence interval on the population mean?

L = _____

U = _____

Suppose each observation is altered by adding -2 and then multiplying that by -3. What is the new mean?

What is the new standard deviation?

7. You draw a random sample of 100 students and ask each of them to secretly roll a fair die. If the result is a 1 or 2, they are supposed to answer yes to the question "Do you use marijuana?" If the result of the roll is a 3, 4, 5, or 6, they should answer honestly. Suppose 92 people answer yes. What is your estimate of the proportion of students who smoke dope?

8. Suppose 60% of Duke students are from North Carolina, 30% are from other states in the U.S., and the rest are from other countries. Also suppose that 80% of in-state students know how Fayetteville got its name, but only 10% of other U.S. citizens know and only 1% of non-nationals know. So if your date explains that people wanted to honor the Marquis de Lafayette's support of the American revolution, but dropped "La" because it meant "the", then what is the probability that your date is a U.S. citizen but not a North Carolinian?

9. Suppose an urn contains 4 white balls and 2 red balls. You draw two balls without replacement. Let A be the event that the first ball is white and let B be the event that at least one ball is white.

What is the probability of A?

What is the probability of B?

What is the probability of A or B?

What is the probability of A and B?

What is the probability of A given B?

10. Among 50 women, 35 like statistics. Among 40 men, 20 like statistics. Is there evidence that more women than men enjoy statistics courses?

What is the null hypothesis (in words)?

What is the formula for your test statistic?

What is the value of your test statistic?

What kind of distribution does your test statistic have under the null?

What is the significance probability?

What is your conclusion?

11. Suppose you classify 100 random teenagers according to whether or not they have had an accident in the last year, and 200 random elderly drivers according to whether they have had an accident in the last year. You find that 40 teenagers have had accidents, and only 30 elderly drivers have had accidents.

Write the contingency table.

What is the null hypothesis?

What is the alternative hypothesis (in words)?

What is the formula for your test statistic?

What is the value of your test statistic?

What kind of distribution does your test statistic have under the null?

What is the significance probability?

What is your conclusion?

What confounding factor could explain this relationship in a way favorable to the teenagers?

12. You own a casino. To test a new supplier of dice, you choose one at random and roll it 100 times. You get 12 ones, 16 twos, 20 threes, 14 fours, 20 fives, and the rest are sixes.

What is the null hypothesis (in words)?

What is the alternative hypothesis (in words)?

What is the formula for your test statistic?

What is the value of your test statistic?

What kind of distribution does your test statistic have under the null?

What is the significance probability?

What is your conclusion?

13. You draw a sample of size 100 without replacement from a class of 120 students and you measure their IQs. You find that the sample mean is 115 and the standard deviation is 10.

What is the value of the finite population correction factor?

Use the fpcf in setting a 90% confidence interval on the mean IQ in the class.

L = _____

U = _____

14. Name the three principles laid out in the *Belmont Report*:

15. You do a regression analysis on 120 students that attempts to predict the score on a person's exam from the amount of time (in hours) spent studying the night before. You find that the intercept is 80, the slope is -7, the correlation coefficient is -.8, and the standard deviation of the residuals is 3.

What is your estimate of the grade for someone who spends 10 hours studying?

Set a 90% upper confidence interval on the grade of someone who spent 10 hours studying.

What proportion of the variance in grade is explained by knowing how many hours were spent studying?

If you were doing multiple regression, what additional variable would help predict the response?

16. Each day my son has probability .4 of doing something crazy. His behavior from one day to the next is independent. What is the probability that he is crazy on exactly 6 of the next 10 days?

17. Who was the greatest statistician ever?
