

Exam 2 – Practice problems

1. True or False: A significant difference among groups is considered large and important.
2. A group of 75 psychology students in Delaware took the Psychology subject portion of the GRE and got a mean score of 520. The population mean score on the GRE is 500 with a standard deviation of 100. Would I be correct in concluding that Delaware psychology students scored better than the national average?
3. A group of 50 New York psychology students got a mean score of 530 on the psychology GRE with a standard deviation of 80. These students claim to be WAY more nerdy than a group of 50 California psychology students who had a mean score of 515 with a standard deviation of 50. Are the New York students truly more nerdy than the California students?
4. I had two groups of people watch either Monty Python and the Holy Grail or In the Army Now (that Pauly Shore movie) and asked them to rate (on a scale of 1-10) how funny it was. People who watched Monty Python gave a mean rating of 9.5 and people who watched In the Army Now gave a mean rating of 6.5. The pooled standard deviation is 2.45. If there were 20 people in each group, what is the power of this experiment? What does this mean?
5. Assume we conducted a dependent samples t-test. Our observed t-value is 1.233. If everything else was equal, but the standard deviation was 4 times smaller, what observed t-value would we expect?
6. When do we use a one-tailed hypothesis test?
7. My experiment has a power of 0.5 (assume two tailed, $\alpha = .05$, known std dev with normal distribution). If I increase my sample size from N to $4N$, what will my power become?
8. We are testing if a new drug called happilift affects BDI depression scores. The mean score on the BDI for the population of patients not taking happilift is 10, but we don't know the standard deviation of these scores. We collect a sample of 32 clients and find the standard deviation of these scores to be 4 and the mean of these scores to be 11. What will our observed test statistic (t value) be?
9. IF the variance of sample 1 (11 subjects) is 20 and the variance of sample 2 (11 subjects) is 40, then what is the pooled variance in an independent t-test?
10. IF the stdev of sample 1 (11 subjects) is 20 and the stdev of sample 2 (21 subjects) is 40, then what is the pooled variance in an independent t-test?
11. What are the 3 sources of variability in a within subjects anova?
12. For a dependent sample t-test that compares the ages of 10 husbands with the ages of their wives, what is the critical value for an $\alpha = .05$ with 2 tails.
13. In an independent t-test, the pooled variance is equal to both the variance of sample 1 and the variance of sample 2. If sample 1 has 100 subjects, then how many subjects are in sample 2?

14. If a confidence interval constructed from a sample is $118 < \mu < 123$, then the mean of that sample must be
15. If the standard deviation is 10 and the standard error is 2, then what is the sample size?
16. I run 1000 experiments, and the null hypothesis is true in reality in every single one of them. What proportion of the experiments will I CORRECTLY reject the null hypothesis ($\alpha = .05$)?
17. I want to make a 95% confidence interval for the population mean given a sample mean of 100, a sample size of 64 and a known normally distributed population with a standard deviation of 10. What is that confidence interval?
18. For an independent sample t-test that compares the ages of 10 men with the ages of 10 women, what is the critical value for an $\alpha = .05$ with 2 tails.
19. The type II error rate of an experiment is the same as the power. If we are using a known population standard deviation with $\alpha = .05$ and two tails, how large is the effect size measured in standard errors?
20. The output indicates that $p < 0.05$; what does this mean? Explain in terms of hypothesis testing.
21. What does significance (no significance) of results mean? What does it tell us about our hypothesis? What does it tell us about the differences between the groups?
22. Write out 7 hypothesis testing steps.
23. During the tennis match, judges want to see who will do better men or women. In your own words, please state null hypothesis and alternative hypothesis.
24. A researcher wants to see who eats more chocolate per day, college students or high school students. He randomly selects a total 30 students (15 college and 15 HS) and asks them to write down every time they eat something containing chocolate. He obtained t is 2.513. Is the difference between groups significant?