

Fall 2022: CSE 5301

Homework 3

Due Date: 2022-10-30, 11:59 pm

Instructions

- The assignment has to be submitted on canvas (<https://uta.instructure.edu>)
- If its typed, make sure the extension is (.pdf)
- If its handwritten, make sure to scan at high enough dpi that the text is legible and readable
 - Save as .pdf
- If your submission is a single file name it as <net-id>_hw3.<extension>
- If your submission is made of multiple files, zip them together into a single archive
 - Only .zip archives accepted
 - Name the file <net-id>_hw3.zip
 - Contact the instructor or TA if you have any issues creating archives
- **ALL WORK HAS TO BE INDIVIDUAL WORK.**

Questions

PDF file is attached for reference pages. Solve following questions from attached file.

Chapter 8 Exercises: 8.3,8.4,8.8

Chapter 9 Exercises:

9.2, 9.4,9.8 , 9.9, 9.10, 9.11,

9.14, 9.17, 9.20 (assum α of 0.05), 9.23, 9.24

- 1) For the higher education case, in a report, only 22 of 295 have education. Given a picking people have education be considered as a Bernoulli trial. If the proportion of higher education in the pool is 0.13. There is an evidence shows the probability that 22 or fewer would be higher education in a sample of 295.
 - What are the appropriate hypotheses?
 - What is p-value?
 - What is the probability of type 2 error if the true proportion of higher education in the pool is 0.10 when $\alpha = 0.05$? (n=295)

- what is the sample size required so that probability of type 2 error with the true proportion of higher education in the pool being 0.10 is at most 0.02 when $\alpha = 0.05$?
- 2) A drug trial is attempted using a real drug and a pill made of just sugar. 18 people are given the real drug in hopes of increasing the production of endorphins. The increase in endorphins is found to be on average 8 micrograms per person, and the sample standard deviation is 5.4 micrograms. 11 people are given the sugar pill, and their average endorphin increase is 4 micrograms with a standard deviation of 2.4. From previous research on endorphins it is determined that it can be assumed that the variances within the two samples can be assumed to be the same. Test at 5% to see if the population mean for the real drug had a significantly greater impact on the endorphins than the population mean with the sugar pill.
- 3) To compare customer satisfaction levels of two competing cable television companies, 174 customers of Company 1 and 355 customers of Company 2 were randomly selected and were asked to rate their cable companies on a five-point scale, with 1 being least satisfied and 5 most satisfied. The survey results are summarized in the following table:

Company 1	Company 2
• $n_1 = 174$	$n_2 = 355$
• $\bar{X} = 3.51$	$\bar{X} = 3.24$
• $S_1 = 0.51$	$S_2 = 0.52$

Construct a point estimate and a 99% confidence interval for $\mu_X - \mu_Y$ the difference in average satisfaction levels of customers of the two companies as measured on this five-point scale. Refer to concerning the mean satisfaction levels of customers of two competing cable television companies. Test at the 1% level of significance whether the data provide sufficient evidence to conclude that Company 1 has a higher mean satisfaction rating than does Company 2. Use the critical value approach by hypothesis testing.