

PHP 2510 Homework 3

Due: Tuesday Dec 6 at 11:59pm

Homework Policies:

You are encouraged to discuss problem sets with your fellow students (and with the Course Instructor of course), but you must write your own final answers, in your own words. Each question is worth 10 points.

Turning the Homework in:

Please turn the homework in through canvas. You may use a pdf or word doc file to turn the assignment in.

1. Generate 50 random values from a $Bin(20, .25)$ distribution.
 - a. Create and interpret a 90% confidence interval using the Z distribution. *Remember, this type of CI requires you know the **population** standard deviation (so use the exact formula for the standard deviation of a binomial).*
 - b. Create and interpret a 90% confidence interval using the t distribution (*this assumes the population standard deviation is unknown*).
 - c. How do these compare?

2. We will work with a sample of data from the National Health and Nutrition Examination Survey (NHANES). Once you download the data (from canvas), you can load it into R:

```
load("/Users/shiradunsiger/Desktop/PHP 2510 Fall 2022/organic.rda")
```

Remember, you need to change the file path to where you have stored this data on your computer.

As part of the survey, participants were asked: *How many cups of vegetables, including dark green, orange, starchy, and other vegetables, would you say a {man/woman/person} of your age and physical activity should eat each day for good health?*

This data is stored numerically in the variable "veggies". US Dietary guidelines suggest adults should eat 2 cups/day of vegetables. Suppose we want to test the hypothesis that adults are not aware of this expectation (by not *aware* here we mean they do not report 2 on average in response to this question). Use a significance level of .05 to test this hypothesis. Show all steps in your hypothesis test.

3. Using the data outlined in question 2, test the hypothesis that there is a significant difference in the mean veggies response between those who report being of at least good

health vs. those with less than good health. Using a 1% level of significance. Be sure to state all steps of your hypothesis test including a conclusion.