

## Instructions

You need to submit this homework online. Take pictures of the written (theory) part; send them (along with the simulation part) to me on Slack or through Canvas before the lecture on Wednesday.

### 1 Theory

- Problem 1: The article “Gender Differences in Individuals with Comorbid Alcohol Dependence and Post-Traumatic Stress Disorder” (Amer. J. Addiction, 2003: 412–423) reported the accompanying data on total score on the Obsessive-Compulsive Drinking Scale (OCS).

<b>Gender</b>	<b>Sample Size</b>	<b>Sample Mean</b>	<b>Sample SD</b>
Male	44	19.93	7.74
Female	40	16.26	7.58

Formulate hypotheses and carry out an appropriate analysis. What is the p-value of the test? Does your conclusion depend on whether a significance level of .05 or .01 was employed?

- Problem 2: The recommended daily dietary allowance for zinc among males older than age 50 years is 15 mg/day. The article “Nutrient Intakes and Dietary Patterns of Older Americans: A National Study” (J. Gerontol., 1992: M145–150) reports the following summary data on intake for a sample of males age 65–74 years:  $n = 115$ ,  $\bar{x} = 11.3$ , and  $s = 6.43$ . Does this data indicate that average daily zinc intake in the population of all males age 65–74 falls below the recommended allowance? What is the p-value of the test?

### 2 Simulations

- Problem 3: A fish survey is done to see if the proportion of fish types is consistent with previous years. Suppose, the 3 types of fish recorded: parrotfish, grouper, tang are historically in a 5:3:4 proportion and in a survey the following counts are found.

Type of fish	parrotfish	grouper	tang
Observed	53	22	49

Do a test of hypothesis to see if this survey of fish has the same proportions as historically.

- Problem 4: Suppose that we have measured the weight (kg) of 18 individuals from two different subgroup (A and B) of the population: 9 from group A and 9 from group B. The data is as follows:

Group A:

51, 50, 55, 80, 56, 58, 64, 52, 64, 65, 71, 62, 76, 62, 62, 66, 84, 56, 75, 58

Group B

66, 74, 48, 33, 65, 41, 67, 59, 34, 70, 75, 67, 67, 48, 45, 57, 58, 50, 37, 65

- Investigate the Q-Q plots of the two dataset to verify normal assumption.
- Does this data indicate that there is a difference in weights between the two subgroups? Perform a two-sample t-test to answer the question.