**Quiz 1 (LSWR chapter 3)**

In your RStudio console or a script:

1. Run the code below. What’s your result?

sqrt(256) \* 0.5

A. 16 B. 256 C. 8 D. 64

2. Create a variable named a and give it a value 3.1415926. Run the code below. What’s your result?

round(a, digits = 3)

A. a B. 3 C. 3.141 D. 3.142

3. Create a variable named b and give it values 1, 2, 3, 4, 5, 6, 7, 8, 9, 10. Run the code below. What’s your result?

sum(b)

A. 55 B. 65 C. 100 D. b

4. (Continued) Which code below will show you the third value of b in question 3?

b[3]

A. b = 3 B. b[3] C. 3 D. b(3)

5. (Continued) run the code below then run the code in question 3 again, what’s your result now?

b[3] <- 13

A. 55 B. 65 C. 100 D. b

**Quiz 2 (LSWR chapter 2 and 7)**

In your RStudio console or a script, simply call “iris” or “data(iris)” and familiarize yourself with this dataset before answering the following questions. Note that all numbers are rounded to two decimal places if needed.

1. What are the scales for the variables “Petal.Length” and “Species”?

A. Interval and Nominal B. Ratio and Nominal C. Interval and Ordinal D. Ratio and Ordinal

2. What are the number and proportion of virginica iris in this dataset?

A. 50, 33.33% B. 100, 66.67% C. 50, 66.67% D. 100, 33.33%

3. Center the variable “Petal.Length” to its mean and call this new variable “Petal.Length.Centered”, then add this new variable to the dataset. Which code from below should you use?

A. Petal.Length.Centered <- Petal.Length – mean(Petal.Length)

B. iris$Petal.Length.Centered <- iris$Petal.Length – mean(iris$Petal.Length)

C. Petal.Length.Centered <- mean(Petal.Length)

D. iris$Petal.Length.Centered <- mean(iris$Petal.Length)

4. Create a new variable “Log.Petal.Length” to be the natural logarithm of “Petal.Length”, what is the maximum value of “Log.Petal.Length”?

A. 1.63 B. 1.03 C. 1.73 D. 1.93

5. Subset the virginica iris observations from the data, what is the mean of “Petal.Length” now?

A. 0.33 B. 5.55 C. 3.76 D. 3.75

**Quiz 3 (LSWR Ch 12)**

In your RStudio console or a script, simply call “mtcars” or “data(mtcars)” and familiarize yourself with [this dataset](https://stat.ethz.ch/R-manual/R-devel/library/datasets/html/mtcars.html) before answering the following questions. Note that all numbers are rounded to two decimal places if needed.

1. What are the observed frequencies of automatic (variable “am” is coded as 0) and manual (variable “am” is coded as 1) car in the data?

A. 13, 19 B. 19, 13 C. 16, 16 D. 13, 13

2. If you think the transmission of the car was not randomly selected, what is your null hypothesis? What are the frequencies of automatic and manual car under your null hypothesis?

The numbers of automatic and manual car are equal. They should be 16 and 16.

3. Either by hand or in R, calculate the value of *X*2 being used to test your null hypothesis.

A. 1.13 B. 1.17 C. 1.21 D. 1.11

4. Run the code below to calculate the 95th percentile of a chi-squared distribution with one degree of freedom, then compare this with your result from question 3. Did you successfully reject your null hypothesis?

qchisq(p = .95, df = 1)

A. Yes, rejected the null hypothesis. B. No, failed to reject the null hypothesis.

5. Do you think the transmission of the car was randomly selected at the 5% level?

A. Yes, it is randomly selected. B. No, it is nor randomly selected.

**Quiz 4 (LSWR Ch 5)**

In your RStudio console or a script, simply call “mtcars” or “data(mtcars)” and familiarize yourself with [this dataset](https://stat.ethz.ch/R-manual/R-devel/library/datasets/html/mtcars.html) before answering the following questions. Note that all numbers are rounded to two decimal places if needed.

1. What is the average fuel consumption measured by miles per gallon (variable “mpg”) in the data? 20.09

2. What is the standard deviation of the variable “mpg”? 6.03

3. Using plot or skewness test in the text, which in the below best describes the skewness of the variable “mpg”?

A. Positive skew B. Negative skew C. No skew at all

4. Standardize the variable “mpg” (transform it into a *z*-score), what is the maximum standard deviation above the mean? 2.29

5. What is the correlation between “hp” and “mpg”? -0.78

**Quiz 5 (LSWR Ch 13)**

In your RStudio console or a script, simply call “mtcars” or “data(mtcars)” and familiarize yourself with [this dataset](https://stat.ethz.ch/R-manual/R-devel/library/datasets/html/mtcars.html) before answering the following questions. Note that all numbers are rounded to two decimal places if needed.

1. The assumption(s) of the *z*-test is/are:

A. Normality B. Independence C. Known standard deviation D. All of the above

2. Assume that the population mean of “mpg” is 17. Run a one-sample *t*-test to investigate whether the observed “mpg” in the data is significantly higher or lower than 17 at the 5% level. Briefly report your result. *t*(31) = 2.90, *p* < 0.05

3. (Continued) write one sentence to formally answer question 2.

The observed “mpg” in the mtcars data is significantly higher than 17 at the 5% level (*t*(31) = 2.90, *p* < 0.05).

4. Run a Welch *t*-test to investigate whether automatic and manual cars in the data are different in fuel consumption on average. Briefly report your results. *t*(18.33) = -3.77, *p* < 0.05

5. (Continued) write one sentence to formally answer question 4.

On average, automatic cars run 7.25 miles less on a gallon gasoline than manual cars (*t*(18.33) = -3.77, *p* < 0.05).