

# Stat 6021: Module B Practice Questions And Answers

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## Topic B.2: Getting Started with R

1. The `mtcars` dataset comes built-in with R. The dataset was extracted from the 1974 *Motor Trend* US magazine and comprises several characteristics of automobile design and performance for 32 automobiles (1973 to 1974 models).

- a) Read this data in and assign it to an object called `cars.df`.

```
cars.df <- mtcars
```

- b) Use the environment window and report how many observations and variables are in this dataset.

```
number_of_observations <- nrow(cars.df)
number_of_observations
```

```
## [1] 32
```

```
number_of_variables <- ncol(cars.df)
number_of_variables
```

```
## [1] 11
```

2. Download the text file `students.txt` from Collab. The file's dataset contains information on students taking an introductory statistics class at a large public university.

- a) Read this data in and assign it to an object called `students.df`.

```
students.df <- read.table("students.txt", header=TRUE)
```

- b) Use the environment window and report how many observations and variables are in this dataset.

```
number_of_observations <- nrow(students.df)
number_of_observations
```

```
## [1] 249
```

```
number_of_variables <- ncol(students.df)
number_of_variables
```

```
## [1] 9
```

3. Install the following packages:

- a) `tidyverse`

```
install.packages("tidyverse", repos = "http://cran.us.r-project.org")
```

```
##
```

```
## The downloaded binary packages are in
```

```
## /var/folders/3n/yy40dngd6xd7n2qcdbz9_nq00000gn/T/Rtmpza4rfz/downloaded_packages
```

b) faraway

```
install.packages("faraway", repos = "http://cran.us.r-project.org")
```

c) MASS

```
install.packages("MASS", repos = "http://cran.us.r-project.org")
```

d) leaps

```
install.packages("leaps", repos = "http://cran.us.r-project.org")
```

e) ROCR

```
install.packages("ROCR", repos = "http://cran.us.r-project.org")
```

f) nycflights13

```
install.packages("nycflights13", repos = "http://cran.us.r-project.org")
```

g) gapminder

```
install.packages("gapminder", repos = "http://cran.us.r-project.org")
```

h) palmerpenguins

```
install.packages("palmerpenguins", repos = "http://cran.us.r-project.org")
```

4. Load the faraway package, and read in the dataset called cornnit and assign it to an object called corn.df.

```
library("faraway")  
corn.df <- cornnit
```

## Topic B.1: Getting Started with R

5. Are the following valid names for objects in R?

a) 2020\_Major

No

b) .2020.Age

No

c) #Courses.2020

No

d) \_\_courses\_\_2020

No

e) Fav\_Sport20

Yes

f) major 2020

No

g) age(2020)

No

h) FavSport\_2020

Yes

6. Create a numeric vector with the following 10 values.

13, 91, 36, 95, 9, 3, 61, 20, 22, 97

Assign these ten values to a vector called `practice`. Use R to find out if `practice` is a character, numeric, or logical object.

```
practice <- c(13, 91, 36, 95, 9, 3, 61, 20, 22, 97)
class(practice)
```

```
## [1] "numeric"
```

7. For each of the following, determine if they are TRUE or FALSE. Try answering first without using R, then use R to confirm.

a) `practice[5] == 5`

```
practice[5] == 5
```

```
## [1] FALSE
```

b) `practice[10] != 97`

```
practice[10] != 97
```

```
## [1] FALSE
```

c) `(practice[1] + practice[2]) < 104`

```
(practice[1] + practice[2]) < 104
```

```
## [1] FALSE
```

d) `(practice[1] + practice[2]) <= 104`

```
(practice[1] + practice[2]) <= 104
```

```
## [1] TRUE
```

e) `(practice[2] == 91) & (practice[9] == 22)`

```
(practice[2] == 91) & (practice[9] == 22)
```

```
## [1] TRUE
```

f) `(practice[5] < 9) | (practice[6] >= 4)`

```
(practice[5] < 9) | (practice[6] >= 4)
```

```
## [1] FALSE
```

8. Create the following matrix in R, and assign it to the object `Mat.A`.

$$\begin{bmatrix} 4 & 1 & 3 \\ 6 & 2 & 1 \end{bmatrix}$$

```
Mat.A <- cbind(c(4,6), c(1,2), c(3,1))
```

a) Give the following column names to `Mat.A`: “Huey,” “Dewey”, “Louie”.

```
colnames(Mat.A) <- c("Huey", "Dewey", "Louie")
Mat.A
```

```
##      Huey Dewey Louie
## [1,]    4     1     3
## [2,]    6     2     1
```

- b) Without using R, what is the output if we type `Mat.A[2,1]`?

```
Mat.A[2,1]
```

```
## Huey
##    6
```

- c) Without using R, what is the output if we type `dim(Mat.A)`?

```
dim(Mat.A)
```

```
## [1] 2 3
```

9. Convert the vector `practice` to a factor. What is the order of the levels in this factor?

```
factor(practice)
```

```
## [1] 13 91 36 95 9 3 61 20 22 97
## Levels: 3 9 13 20 22 36 61 91 95 97
```

```
length(factor(practice))
```

```
## [1] 10
```

## Topic B.4: R Markdown

10. Type up your answers to these questions using R Markdown, and output an HTML file.

```
rmarkdown::render("Practice_Answers.Rmd", "html_document")
```