Week 1 Quiz

1. The R language is a dialect of which of the following programming languages?

1 / 1 point

○ Haskell

○ Java

◉ S

○ C

Correct

R is a dialect of the S language which was developed at Bell Labs.

2. The definition of free software consists of four freedoms (freedoms 0 through 3). Which of the following is NOT one of the freedoms that are part of the definition? Select all that apply.

1 / 1 point

☐ The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

☑ The freedom to prevent users from using the software for undesirable purposes.

Correct

This is not part of the free software definition. Freedom 0 requires that the users of free software be free to use the software for any purpose.

☐ The freedom to redistribute copies so you can help your neighbor.

☑ The freedom to sell the software for any price.

Correct

This is not part of the free software definition. The free software definition does not mention anything about selling software (although it does not disallow it).

☐ The freedom to run the program, for any purpose.

☑ The freedom to restrict access to the source code for the software.

Correct

This is not part of the free software definition. Freedoms 1 and 3 require access to the source code.

☐ The freedom to study how the program works, and adapt it to your needs.

3. In R the following are all atomic data types EXCEPT: (Select all that apply)

1 / 1 point

☐ integer

☑ array

Correct

'array' is not an atomic data type in R.

☐ numeric

☑ matrix

Correct

'matrix' is not an atomic data type in R.

☑ data frame

Correct

'data frame' is not an atomic data type in R.

☐ character

☐ logical

☑ table

Correct

'table' is not an atomic data type in R.

☑ list

Correct

'list' is not an atomic data type in R.

☐ complex

4. If I execute the expression x <- 4 in R, what is the class of the object `x' as determined by the `class()' function?

1 / 1 point

○ real

○ vector

○ complex

○ matrix

◉ numeric

○ list

○ integer

Correct

5. What is the class of the object defined by x <- c(4, TRUE)?

1 / 1 point

○ integer

○ matrix

○ list

◉ numeric

○ logical

○ character

Correct

The numeric class is the "lowest common denominator" here and so all elements will be coerced into that class.

6. If I have two vectors x <- c(1,3, 5) and y <- c(3, 2, 10), what is produced by the expression cbind(x, y)?

1 / 1 point

○ a 2 by 3 matrix

○ a 2 by 2 matrix

○ a 3 by 3 matrix

○ a vector of length 2

◉ matrix with 2 columns and 3 rows

○ a vector of length 3

Correct

The 'cbind' function treats vectors as if they were columns of a matrix. It then takes those vectors and binds them together column-wise to create a matrix.

7. A key property of vectors in R is that

1 / 1 point

◉ elements of a vector all must be of the same class

○ elements of a vector can only be character or numeric

○ elements of a vector can be of different classes

○ the length of a vector must be less than 32,768

○ a vector cannot have have attributes like dimensions

Correct

8. Suppose I have a list defined as x <- list(2, "a", "b", TRUE). What does x[[2]] give me? Select all that apply.

1 / 1 point

☐ a list containing a character vector with the elements "a" and "b".

☑ a character vector containing the letter "a".

Correct

☑ a character vector of length 1.

Correct

☐ a list containing character vector with the letter "a".

☐ a character vector with the elements "a" and "b".

9. Suppose I have a vector x <- 1:4 and a vector y <- 2. What is produced by the expression x + y?

1 / 1 point

○ a numeric vector with elements 3, 2, 3, 4.

○ an integer vector with elements 3, 2, 3, 6.

○ an integer vector with elements 3, 2, 3, 4.

○ a numeric vector with elements 1, 2, 3, 6.

○ a numeric vector with elements 3, 2, 3, 6.

◉ <mark>a numeric vector with elements 3, 4, 5, 6.</mark>

Correct

10.   Suppose I have a vector x <- c(17, 14, 4, 5, 13, 12, 10) and I want to set all elements of this vector that are greater than 10 to be equal to 4. What R code achieves this? Select all that apply.

1 / 1 point

☐ x[x >= 10] <- 4

☐ x[x > 4] <- 10

☐ x[x < 10] <- 4

☐ x[x == 4] > 10

☐ x[x == 10] <- 4

☑ <mark>x[x >= 11] <- 4</mark>

Correct

You can create a logical vector with the expression x >= 11 and then use the [operator to subset the original vector x.

☐ x[x > 10] == 4

☑ <mark>x[x > 10] <- 4</mark>

Correct

You can create a logical vector with the expression x > 10 and then use the [operator to subset the original vector x.

11.   Use the <u>Week 1 Quiz Data Set</u> to answer questions 11-20.
In the dataset provided for this Quiz, what are the column names of the dataset?

1 / 1 point

○ Ozone, Solar.R, Wind

◉ <mark>Ozone, Solar.R, Wind, Temp, Month, Day</mark>

○ Month, Day, Temp, Wind

○ 1, 2, 3, 4, 5, 6

Correct

You can get the column names of a data frame with the `names()' function.

12.   Extract the first 2 rows of the data frame and print them to the console. What does the output look like?

1 / 1 point

◉

Ozone	Solar.R	Wind	Temp	Month	Day
1	41	190	7.4	67	5	1

```
2  36    118 8.0 72    5  2
```
○

	Ozone	Solar.R	Wind	Temp	Month	Day
1	9	24	10.9	71	9	14
2	18	131	8.0	76	9	29

○

	Ozone	Solar.R	Wind	Temp	Month	Day
1	18	224	13.8	67	9	17
2	NA	258	9.7	81	7	22

○

1	7	NA	6.9	74	5	11
2	35	274	10.3	82	7	17

Correct
You can extract the first two rows using the [operator and an integer sequence to index the rows.

13.   **How many observations (i.e. rows) are in this data frame?**

1 / 1 point

○ 129

◉ <mark>153</mark>

○ 160

○ 45

Correct
You can use the `nrows()` function to compute the number of rows in a data frame.

14.   **Extract the *last* 2 rows of the data frame and print them to the console. What does the output look like?**

1 / 1 point

◉

	Ozone	Solar.R	Wind	Temp	Month	Day
152	18	131	8.0	76	9	29
153	20	223	11.5	68	9	30

○

	Ozone	Solar.R	Wind	Temp	Month	Day
152	31	244	10.9	78	8	19
153	29	127	9.7	82	6	7

○

	Ozone	Solar.R	Wind	Temp	Month	Day
152	11	44	9.7	62	5	20
153	108	223	8.0	85	7	25

○

	Ozone	Solar.R	Wind	Temp	Month	Day

| 152 | 34 | 307 | 12.0 | 66 | 5 | 17 |
| 153 | 13 | 27 | 10.3 | 76 | 9 | 18 |

Correct

The `tail()' function is an easy way to extract the last few elements of an R object.

15.   What is the value of Ozone in the 47th row?

1 / 1 point

◉ <mark>21</mark>

○ 63

○ 18

○ 34

Correct

The single bracket [operator can be used to extract individual rows of a data frame.

16.   How many missing values are in the Ozone column of this data frame?

1 / 1 point

○ 78

○ 43

○ 9

◉ <mark>37</mark>

Correct

The `is.na' function can be used to test for missing values.

17.   What is the mean of the Ozone column in this dataset? Exclude missing values (coded as NA) from this calculation.

1 / 1 point

○ 53.2

○ 31.5

○ 18.0

◉ <mark>42.1</mark>

Correct

The `mean' function can be used to calculate the mean.

18.   Extract the subset of rows of the data frame where Ozone values are above 31 and Temp values are above 90. What is the mean of Solar.R in this subset?

1 / 1 point

○ 185.9

○ 205.0

◉ <mark>212.8</mark>

○ 334.0

Correct

You need to construct a logical vector in R to match the question's requirements. Then use that logical vector to subset the data frame.

19. **What is the mean of "Temp" when "Month" is equal to 6?**

1 / 1 point

○ 90.2

○ 75.3

◉ <mark>79.1</mark>

○ 85.6

Correct

20. **What was the maximum ozone value in the month of May (i.e. Month is equal to 5)?**

1 / 1 point

○ 18

○ 97

◉ <mark>115</mark>

○ 100

Correct