

Week 1 Quiz

1.Question 1

R was developed by statisticians working at



The University of Auckland



Microsoft



Johns Hopkins University



Harvard University

Correct

The R language was developed by Ross Ihaka and Robert Gentleman who were statisticians at the University of Auckland in New Zealand.

2.Question 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.



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



The freedom to run the program, for any purpose.



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



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



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.

3.Question 3

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



list

Correct

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



numeric



table

Correct

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



matrix

Correct

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



data frame

Correct

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



array

Correct

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



complex



character



integer



logical

4.Question 4

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



matrix



numeric



complex



character



logical



integer

Correct

The 'L' suffix creates an integer vector as opposed to a numeric vector.

5.Question 5

What is the class of the object defined by the expression `x <- c(4, "a", TRUE)`?



mixed



integer



numeric



logical



character

Correct

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

6.Question 6

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

☐

a 3 by 2 matrix

☒

a matrix with two rows and three columns

☐

a vector of length 2

☐

a vector of length 3

☐

a 2 by 2 matrix

☐

a 3 by 3 matrix

Correct

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

7.Question 7

A key property of vectors in R is that

☐

elements of a vector can only be character or numeric

☒

elements of a vector all must be of the same class

☐

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

☐

elements of a vector can be of different classes



a vector cannot have have attributes like dimensions

Correct

8.Question 8

Suppose I have a list defined as `x <- list(2, "a", "b", TRUE)`. What does `x[[1]]` give me? Select all that apply.



a numeric vector containing the element 2.

Correct



a list containing the number 2.



a character vector containing the element "2".



a list containing the letter "a".



a numeric vector of length 1.

Correct

9.Question 9

Suppose I have a vector `x <- 1:4` and `y <- 2:3`. What is produced by the expression `x + y`?



an integer vector with the values 3, 5, 3, 4.



an error.



a warning



a numeric vector with the values 1, 2, 5, 7.



a numeric vector with the values 3, 5, 3, 4.



an numeric vector with the values 3, 5, 5, 7.



an integer vector with the values 3, 5, 5, 7.

Correct

10.Question 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.



`x[x >= 11] <- 4`

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`



`x[x == 4] > 10`



`x[x > 10] <- 4`

Correct

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



`x[x >= 10] <- 4`



`x[x > 10] == 4`



`x[x > 4] <- 10`



`x[x == 10] <- 4`

11.Question 11

Use the [Week 1 Quiz Data Set](#) to answer questions 11-20.

In the dataset provided for this Quiz, what are the column names of the dataset?



Ozone, Solar.R, Wind



Ozone, Solar.R, Wind, Temp, Month, Day



1, 2, 3, 4, 5, 6



Month, Day, Temp, Wind

Correct

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

12.Question 12

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



	Ozone	Solar.R	Wind	Temp	Month	Day
1	7	NA	6.9	74	5	11
2	35	274	10.3	82	7	17



	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	41	190	7.4	67	5	1
2	36	118	8.0	72	5	2



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

Correct

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

13.Question 13

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



129



153



45



160

Correct

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

14.Question 14

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



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



	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	11	44	9.7	62	5	20
153	108	223	8.0	85	7	25

Correct

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

15.Question 15

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



18



34



63



21

Correct

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

16.Question 16

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

☐

9

☒

37

☐

78

☐

43

Correct

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

17.Question 17

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

☐

53.2

☐

31.5

☒

42.1

☐

18.0

Correct

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

18.Question 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?

☐

185.9

☒

212.8

☐

334.0

☐

205.0

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.Question 19

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

☒

79.1

☐

90.2

☐

75.3

☐

85.6

Correct

20.Question 20

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



100



115



97



18

Correct