Quiz 1: MA2107 Prog. Workshop

- **Instructions**
  a. **Questions may have multiple answers. You will get the marks only if you tick all the correct answers.**
  b. **You can submit the form only once. Before submitting make sure everything is fine.**
  c. **Do not use an R engine.**
  d. While reading the questions you should concentrate on the values and not the formats. For example '2 4' and '2 4' are same.
  e. Use of books/notes are allowed.
  f. **Do not discuss the answers with your classmates.**

* Required

* This form will record your name, please fill your name.

1

ID number (in capitals) *

2

What does the following code do:

```
for (i in 1:10000000) {
  cat("Current values of i=",i,".\b")
}
```

(2 Points)

- [ ] Prints nothing
- [ ] Prints 10000000 sentences.
- [ ] It shows an error message because for loop has not been used appropriately.
- [ ] Prints all the numbers between 1 and 10000000 in bold.

3

Which of the following statements are true?

(2 Points)

- [ ] ***abline*** function is defined in the R-base environment.
- [ ] ***polygon*** function is defined in the R-base environment.
- [ ] ***ggplot*** function is defined in the R-base environment.
- [ ] ***qplot*** function is defined in the R-base environment.

4

Pick the correct statement(s).

```
X <- Norm(mean = 0, sd = 1)
Y <- 3*X+2
Z1 <-  Norm(mean = 2, sd = sqrt(3))
Z2 <-  Norm(mean = 2, sd = 3)
Z3 <-  Norm(mean = 0, sd = sqrt(3))
```

(2 Points)

distrEx library is used.

- [ ] Y and Z1 have the same distribution.
- [ ] Y and Z2 have the same distribution.
- [ ] Y and Z3 have the same distribution.
- [ ] None of the above

5

What does the following code prints:

```
S <- rolldie(2, makespace = TRUE)
S <- addrv(S, FUN = max, invars = c("X1", "X2"),
        name = "U")
S <- addrv(S, FUN = sum, invars = c("X1", "X2"),
        name = "V")
marginal(S, vars = c("U", "V"))
```

(2 Points)

Note: Necessary package from our syllabus is used.

- [ ] Marginal distribution of the random variable U+V.
- [ ] Joint distribution of the random variables U, V.
- [ ] Marginal distribution of the random variable max(U,V).
- [ ] Marginal distribution of the random variable UV.

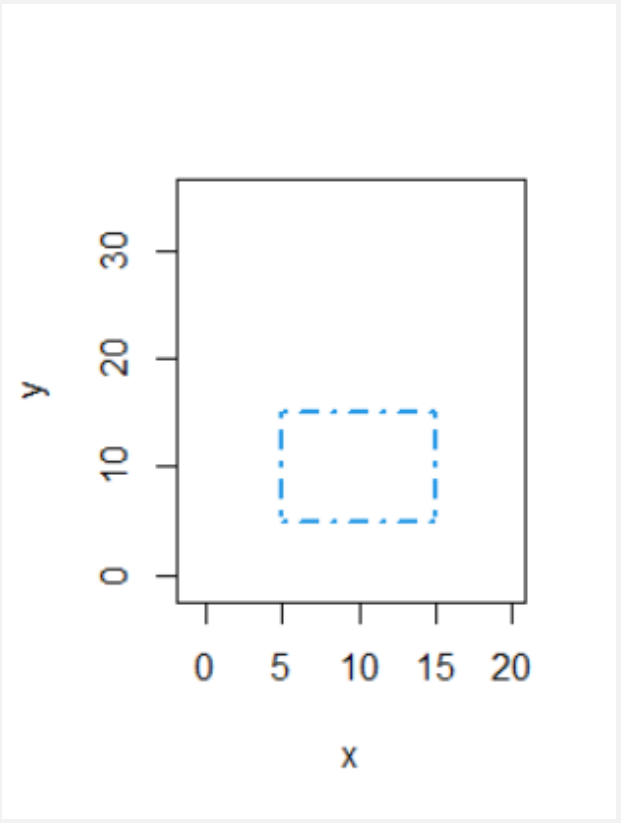
6

What happens to the pdf graph of t-distribution if we increase the number of degrees of freedom.

(2 Points)

- [ ] The curves become taller.
- [ ] The curves with more degrees of freedom have thinner tails.
- [ ] The curves with more degrees of freedom are more like a N(0,1) distribution
- [ ] The curves become non-symmetric about mean.

7



Look at the figure and pick the correct line of code which is a possible part of the main code to generate this figure.

(2 Points)

- ☐ ***segments(x0=c(5,5),y0=c(15,5),x1=c(15,15),y1=c(15,5), col=4,lty=4,lwd=2)***
- ☐ ***segments(x0=c(5,15),y0=c(15,15),x1=c(5,15),y1=c(5,5), col=4,lty=4,lwd=2)***
- ☐ ***segments(x0=c(5,5),y0=c(5,5),x1=c(15,15),y1=c(15,5), col=4,lty=4,lwd=2)***
- ☐ ***segments(x0=c(5,15,5,5),y0=c(15,15,15,5),x1=c(5,15,15,15),y1=c(5,5,15,5), col=4,lty=4,lwd=2)***

8

Suppose x is any vector. What are the possible output of the following?
rep(x=x,each=length(x))-x

(2 Points)

- [ ] [1] 0 0 0 0
- [ ] [1] 0 1 2 0 1 2 0
- [ ] [1] 0 3 -2 -3 -3 0 -5 -6 2 5 0 -1 3 6 1 0
- [ ] [1] 0 -2 2 0

9

Suppose the output of
value <- c(m,n)
ifelse (test=value^2==c(4,100), yes=1, no=0) is ***[1] 1 1*** .

What is the value of m and n?
(2 Points)

Type the answer as ***3,9*** if m=3 and n=9. You may lose marks unless you write in this format.

10

Explain ***3!=6*** .
(2 Points)

- [ ] The output is TRUE as factorial of 3 is 6.
- [ ] Output is FALSE.
- [ ] 3!=6 is not a logical value.
- [ ] None of the above.

11

Which of the following could be a output of
sample(12, size = 10, replace = TRUE) ?

(2 Points)

- [ ] [1] 8 4 1 1 2 4 4 3 5 4 3 5
- [ ] [1] 9 4 3 1 2 7 10 8 5 11
- [ ] [1] 7 11 9 4 10 7 1 3 1 12
- [ ] [1] 10 5 9 6 9 9 4 5 6 8 3 6

12

If A is a 5×5 matrix which of the following best matches the output of
A%*%solve(A) ?

(2 Points)

- [ ] Error message
- [ ] An identity matrix
- [ ] A column vector of length 16.
- [ ] A row vector of length 16.

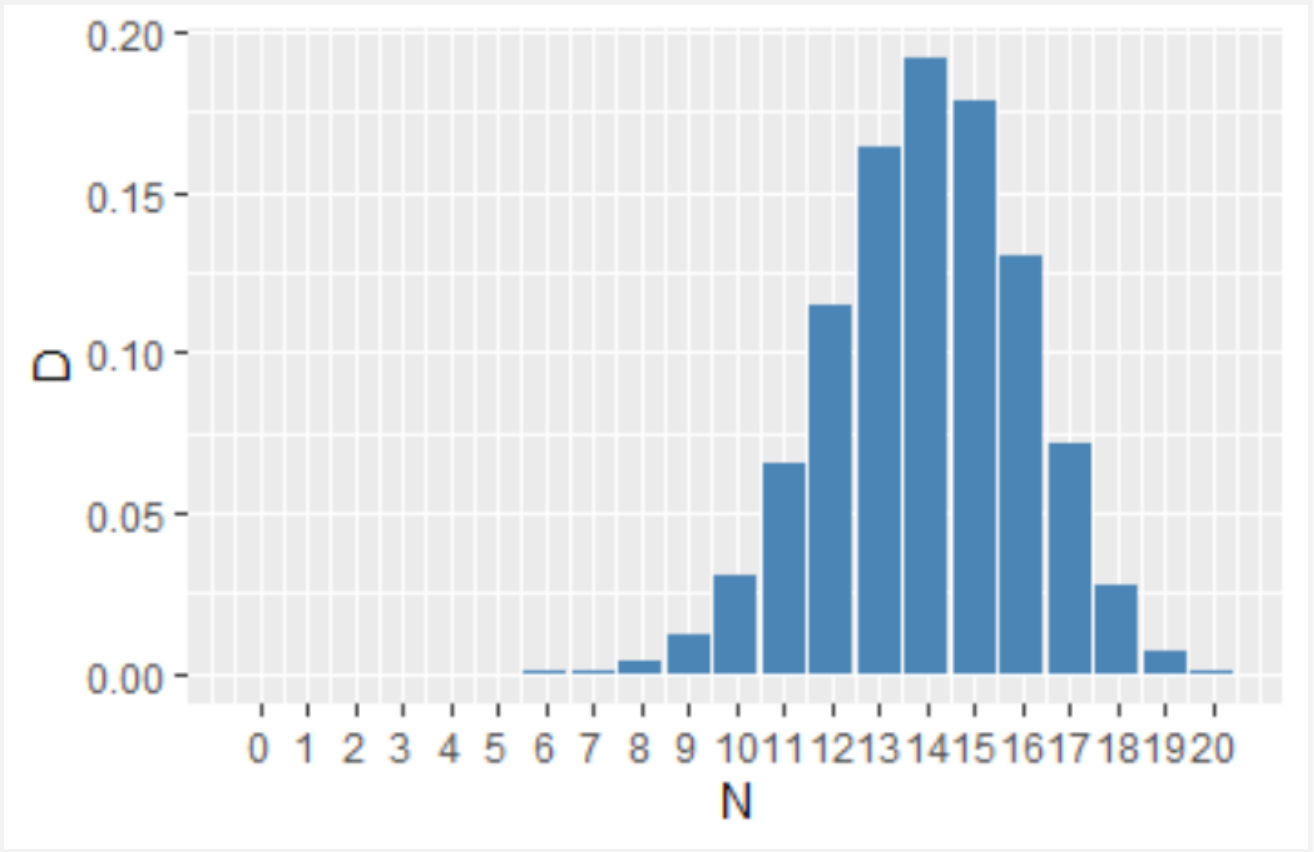
13

The following is used to generate a graph:

```
k=seq(0,20,1)
dbin <- data.frame(N=k,D=dbinom(k, size = 20, p = 0.7))
ggplot(data=dbin, aes(x=N, y=D)) +
geom_bar(stat="identity",width=0.9,fill="steelblue")+
scale_x_continuous(breaks=k)
```

Then choose the correct statement(s).

(2 Points)



- [ ] This is the graph of the cdf of the binomial distribution.
- [ ] This is the graph of the pdf of the binomial distribution.
- [ ] This is the graph of the pdf of a normal distribution.
- [ ] All of the above.

14

Suppose we have the following dataframe:
my_data <-
data.frame(person=c("Ramesh","Priyanka","Vinodh","Ravi","Palak"),
age=c(22,19,17,19,20),
sex=c("M","F","M","M","F")
)
Then which of the following are true.

(2 Points)

- ☐ ***my_data$person[my_data$age==17]*** prints the name of the person whose age is 17.
- ☐ The sex attribute of my_data is a character vector.
- ☐ The sex attribute of my_data is a factor with levels M and F.
- ☐ ***my_data*** is a not a dataframe.

15

What is the dimension of the following matrix M?
M <- matrix(runif(16, min = 0, max = 1), nrow = 4)
(2 Points)

- ☐ 16×4
- ☐ 4×4×16
- ☐ 4×16
- ☐ 4×4

16

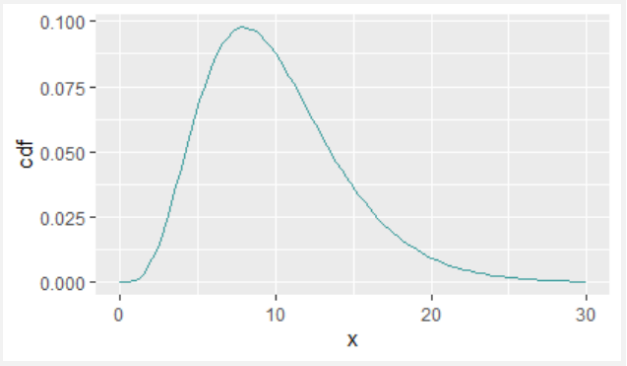
Which of the following are acceptable scalar variable name in R?
(2 Points)

- [ ] 1plus
- [ ] data_average
- [ ] BigData
- [ ] data.mean

17

Pick the correct statement(s).

(2 Points)



- [ ] This is the graph of the cdf of a normal variate.
- [ ] This is the graph of the pdf of a normal variate.
- [ ] This is a graph of a valid cdf.
- [ ] This could be a graph of a valid pdf.

18

Suppose A is a vector of length 8. Then which of the following is a valid output of ***sort(x=A,decreasing = FALSE)*** ?

(2 Points)

- [ ] [1] -7 -6 -5 -4 -3 -2 -1 0
- [ ] [1] 0 3 5 3 8 9 5 2
- [ ] [1] 1 2 3 4 5 6 7
- [ ] [1] 9 7 5 3 2 1 0 -1

19

Look at the following code and pick the correct statement(s):
X <- Norm(mean = 0, sd = 1)
Y <- X^2
Z <- Chisq(df = 1)

(2 Points)

distrEx library is used.

- [ ] Y and Z have same distribution.
- [ ] p(Z)(0.6) gives that value of pdf of Z at 0.6.
- [ ] p[Z](0.6) gives that value of pdf of Z at 0.6.
- [ ] p(Z)(0.6) gives that value of cdf of Z at 0.6.

20

The following are the first few lines of the file ***somefile.txt*** :

Name;Sex;Age;Height;Weight
Alex; M;41;74;170
Bert; M;42;68;166
Carl; M;32;70;155
Dave; M;39;72;167
Elly; F;30;66;124
Fran; F;33;66;115
The data was written from a dataframe having five columns *Name, Sex, Age, Height, Weight*. Find out the correct command used to write the file.

(2 Points)

- ☐ ***write.table(x=my.csvtable,file="somenewfile.txt", sep=" ",row.names=F,quote = F,col.names = T)***
- ☐ ***write.table(x=my.csvtable,file="somenewfile.txt", sep=",",row.names=F,quote = F,col.names = T)***
- ☐ ***write.table(x=my.csvtable,file="somenewfile.txt", sep=";",row.names=F,quote = F,col.names = F)***
- ☐ ***write.table(x=my.csvtable,file="somenewfile.txt", sep=";",row.names=T,quote = F,col.names = F)***

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Suppose m and n are integers. Then which of the following is the output of: ***seq(m,n,by=4)*** ?

(2 Points)

- ☐ [1] -2 2
- ☐ [1] 64 16 4 1
- ☐ [1] 1 4 16 64
- ☐ [1] 1 0.25 0.0625 0.015625