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Q.1) Five terminals on an on-line computer system are attached to a communication line to thecentral computer system. The probability that any terminal is ready to transmit is 0.95. Let Xdenote the number of ready terminals.

(a)Find the probability of getting exactly 3 ready terminals.

Ans >dbinom(x = 3, size = 5, prob = 0.95)

[1] 0.02143438

(b)Find all the probabilities.

Ans >x <- 0:5
>dbinom(x, size = 5, prob = 0.95)
[1] 0.0000003125
[2]0.0000296875
[3]0.0011281250
[4]0.0214343750
[5]0.2036265625
[6] 0.7737809375

Q.2) It is known that 20% of integrated circuit chips on a production line are defective. To maintainand monitor the quality of the chips, a sample of twenty chips is selected at regular intervals forinspection. Let X denote the number of defectives found in the sample. Find the probability ofdifferent number of defective found in the sample?

>x <- 0:20
>dbinom(x, size = 20, prob = 0.2)
[1] 1.152922e-02
[2]5.764608e-02
[3]1.369094e-01
[4]2.053641e-01
[5]2.181994e-01
[6] 1.745595e-01
[7]1.090997e-01
[8]5.454985e-02
[9]2.216088e-02
[10]7.386959e-03
[11] 2.031414e-03
[12]4.616849e-04

[13]8.656592e-05
[14]1.331783e-05
[15]1.664729e-06
[16] 1.664729e-07
[17]1.300570e-08
[18]7.650410e-10
[19]3.187671e-11
[20]8.388608e-13
[21] 1.048576e-14

Q.3) It is known that 1% of bits transmitted through a digital transmission are received in error.One hundred bits are transmitted each day. Find the probability of different number of bits foundin error each day.?

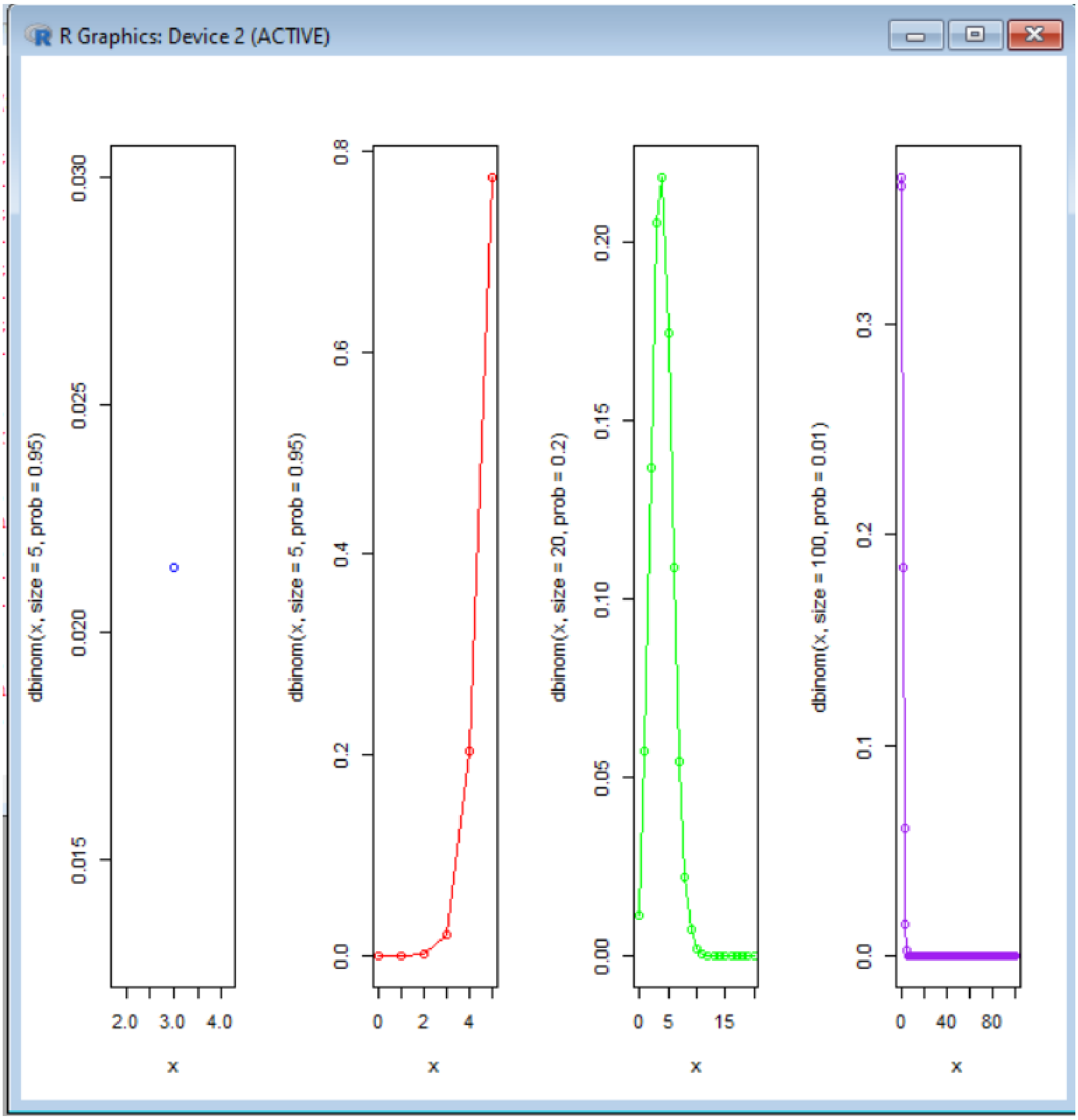
Ans

```
>x <- 0:100
>dbinom(x, size = 100, prob = 0.01)
[1]  3.660323e-01  3.697296e-01  1.848648e-01  6.099917e-02
1.494171e-02
 [6]  2.897787e-03  4.634508e-04  6.286346e-05  7.381694e-06
7.621951e-07
 [11]  7.006036e-08  5.790112e-09  4.337710e-10  2.965956e-11
1.861747e-12
 [16]  1.078184e-13  5.785707e-15  2.887697e-16  1.344999e-17
5.863367e-19
 [21]  2.398650e-20  9.230014e-22  3.347893e-23  1.146841e-24
3.716614e-26
 [26]  1.141263e-27  3.325359e-29  9.206008e-31  2.424382e-32
6.079954e-34
 [31]  1.453457e-35  3.315151e-37  7.220499e-39  1.502889e-40
2.991491e-42
 [36]  5.698078e-44  1.039212e-45  1.815713e-47  3.040667e-49
4.882708e-51
 [41]  7.521343e-53  1.111802e-54  1.577594e-56  2.149411e-58
2.812590e-60
 [46]  3.535467e-62  4.269888e-64  4.955382e-66  5.526836e-68
5.924459e-70
 [51]  6.103988e-72  6.044749e-74  5.753549e-76  5.263395e-78
4.627377e-80
 [56]  3.909263e-82  3.173103e-84  2.474154e-86  1.852815e-88
1.332276e-90
```

```
 [61]  9.195842e-93  6.090970e-95  3.870118e-97  2.357936e-99
1.376951e-101
 [66] 7.703225e-104 4.126306e-106 2.115098e-108 1.036813e-110
4.856976e-113
 [71] 2.172673e-115 9.273039e-118 3.772701e-120 1.461680e-122
5.387028e-125
 [76] 1.886367e-127 6.267832e-130 1.973343e-132 5.877609e-135
1.653336e-137
 [81] 4.383845e-140 1.093365e-142 2.558996e-145 5.605686e-148
1.145943e-150
 [86] 2.178859e-153 3.838722e-156 6.239651e-159 9.310773e-162
1.268066e-164
 [91] 1.565513e-167 1.737722e-170 1.717116e-173 1.492009e-176
1.122294e-179
 [96] 7.159768e-183 3.766713e-186 1.568973e-189 4.851495e-193
9.900000e-197
[101] 1.000000e-200
```

Q.4) Plot all of the above problems in a single window for random variable and respective Probabilitydistribution.

```
>par(mfrow = c(1,4))
>x = 3
>plot(x,dbinom(x, size = 5, prob = 0.95),type = 'o', col = 'blue')
>x <- 0:5
>plot(x,dbinom(x, size = 5, prob = 0.95),type = 'o', col = 'red')
>x <- 0:20
>plot(x,dbinom(x, size = 20, prob = 0.2),type = 'o', col = 'green')
>x <- 0:100
>plot(x,dbinom(x, size = 100, prob = 0.01),type = 'o', col = 'purple')
```


R Graphics: Device 2 (ACTIVE)
dbinom(x, size = 5, prob = 0.95)
0.015
0.020
0.025
0.030
2.0
3.0
4.0
x
dbinom(x, size = 5, prob = 0.95)
0.0
0.2
0.4
0.6
0.8
0
2
4
x
dbinom(x, size = 20, prob = 0.2)
0.00
0.05
0.10
0.15
0.20
0
5
15
x
dbinom(x, size = 100, prob = 0.01)
0.0
0.1
0.2
0.3
0
40
80
x

Q.5) For Q.No. 1 Find P(X = 3) and P(X>3).For Q. No. 2 Find P(X = 4) and P(X>4).Find all the cumulative probabilities and round to 4 decimal places.

```
>y <- 1-pbinom(3, 5, 0.95)
>y
[1] 0.9774075
 >a <- dbinom(x = 4, size = 20, prob = 0.2)
>a
[1] 0.2181994
>round(a,4)
[1] 0.2182
>g <- 4
>q <- 1- pbinom(g, size = 20, prob = 0.2)
>q
[1] 0.3703517
>round(q,4)
[1] 0.3704
```

Q.6) The probability that a patient recover from a rare blood disease is 0.4. If 15 people are knownto have contracted this disease, what is the probability that

(a)at least 10 survive,

```
>f = 9
>c <- 1 - pbinom(f, size = 15, prob = 0.4)
>c
[1] 0.0338333
```

(b)from 3 to 8 survive,

```
>j = 8

>g = 3

 >n <- pbinom(j, size = 15, prob = 0.4)

>n

[1] 0.9049526

>m <- n - pbinom(g, size = 15, prob = 0.4)
>m
[1] 0.8144507
```

(c)exactly 5 survive?

```
>i=5

>c <- 1 - pbinom(i, size = 15, prob = 0.4)
>c
```

[1] 0.5967844