Untitled1.R

macbook

2025-03-04

```
rm(list=ls())
rnorm(10, 5,5)
```

```
##  [1] 15.6239650  3.0571133 11.6639331  8.3559296 11.3345355  9.6364899
##  [7]  0.9112918 10.7379571  8.8466006  5.4132943
```

```
a1=rnorm(10, 5 ,1)
a1
```

```
##  [1] 6.960963 6.051919 6.237371 4.804311 4.651272 5.250228 3.800031 4.553314
##  [9] 3.900819 5.171290
```

```
a2=rnorm(100,5,1)
a3=rnorm(1000,5,1)
a4=rnorm(100000,5,1)
mean(a1)
```

```
## [1] 5.138152
```

```
mean(a2)
```

```
## [1] 4.940309
```

```
mean(a3)
```

```
## [1] 5.030954
```

```
mean(a4)
```

```
## [1] 4.999399
```

```
var(a1)
```

```
## [1] 1.043517
```

```
b=rnorm(10, 5, 5)

mean(b)
```

```
## [1] 6.452261
```

```
var(b)
```

```
## [1] 21.26763
```

```
sd(b)
```

```
## [1] 4.611684
```

```
sum(rnorm(100))
```

```
## [1] -2.07715
```

```
runif(1)
```

```
## [1] 0.7307078
```

```
runif(2)
```

```
## [1] 0.3788667 0.3853998
```

```
rnorm(1, 17, 2)
```

```
## [1] 16.75059
```

```
runif(1, 15, 20)
```

```
## [1] 16.55184
```

```
runif(10, -5, 8)
```

```
##  [1]  1.2568795  7.4911952  5.6889100 -4.2191724 -3.6968316 -3.0603374
##  [7] -2.0360053 -0.1948472  7.3311741  7.4210626
```

```
rt(10,2)
```

```
##  [1]  7.0843512 -0.1675023 -0.9483477  0.3347183  1.9094740  1.3134441
##  [7] -0.6743635  0.9634205 -2.9697483  1.1233519
```

```
a1=rnorm(100000)
mean(a1)
```

```
## [1] 0.00146401
```

```
a2=rt(100000, 30)
mean(a2)
```

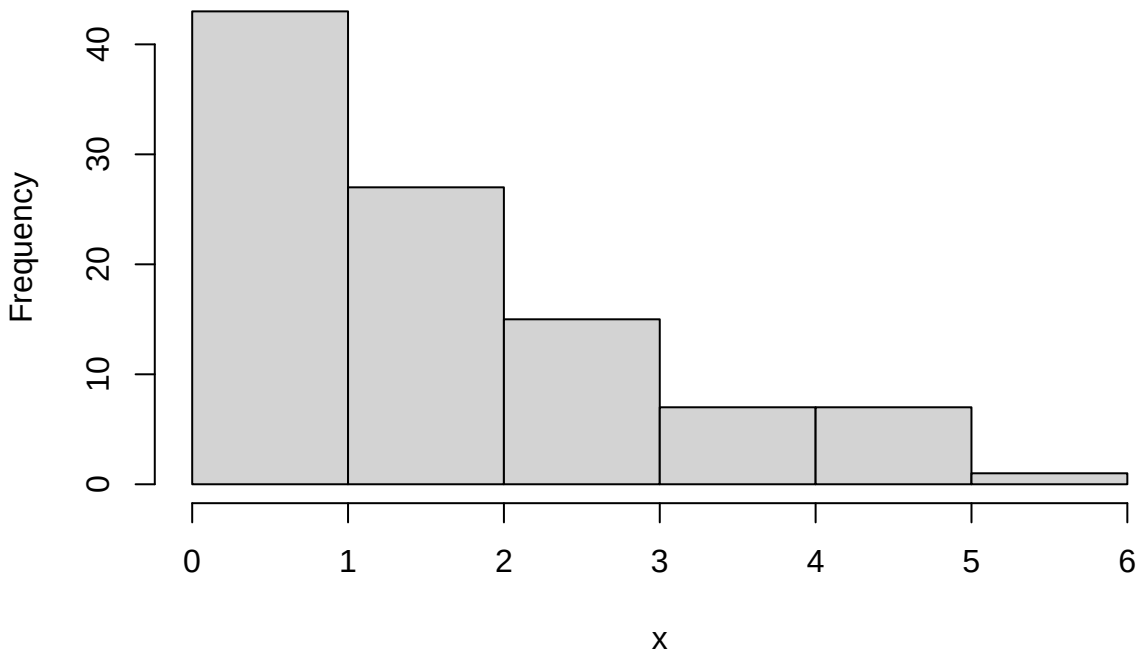
```
## [1] 0.006636348
```

```
var(a2)
```

```
## [1] 1.075996
```

```
#rt(10)

x=rpois(100, 2)
hist(x)
```




```
#X~P(lambda=5)=====>P(X=2)=?
```

```
dpois(2, 5)
```

```
## [1] 0.08422434
```

```
ppois(2,5)# P(X<=2)
```

```
## [1] 0.124652
```

```
dpois(0, 5)+dpois(1, 5)+dpois(2, 5)
```

```
## [1] 0.124652
```

```
exp(-5)*5^2/factorial(2)
```

```
## [1] 0.08422434
```

```
#X~P(lambda=5)=====>P(X<=2)=?
ppois(2,5)
```

```
## [1] 0.124652
```

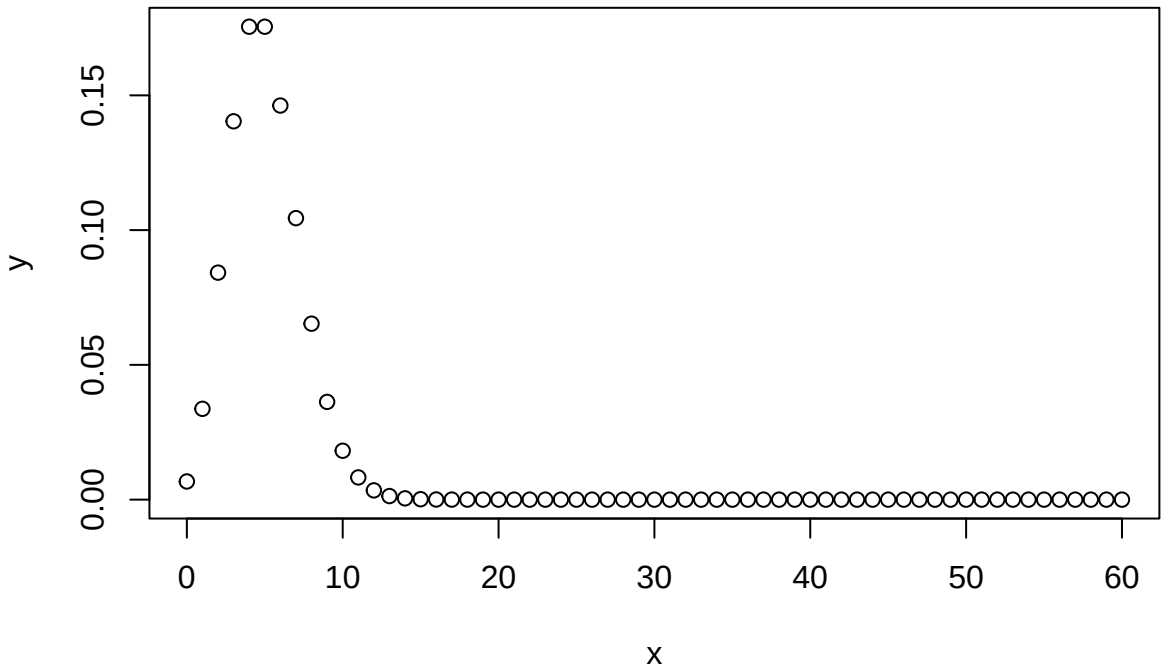
```
dpois(0,5)+dpois(1,5)+dpois(2,5)
```

```
## [1] 0.124652
```

```
x=seq(0,60);x
```

```
##  [1]  0  1  2  3  4  5  6  7  8  9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24
## [26] 25 26 27 28 29 30 31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49
## [51] 50 51 52 53 54 55 56 57 58 59 60
```

```
y=exp(-5)*5^x/factorial(x)
plot(x,y)
```




```
cbind(x,y)
```

```
##        x           y
##  [1,]  0 6.737947e-03
##  [2,]  1 3.368973e-02
##  [3,]  2 8.422434e-02
##  [4,]  3 1.403739e-01
##  [5,]  4 1.754674e-01
##  [6,]  5 1.754674e-01
##  [7,]  6 1.462228e-01
##  [8,]  7 1.044449e-01
##  [9,]  8 6.527804e-02
## [10,]  9 3.626558e-02
## [11,] 10 1.813279e-02
## [12,] 11 8.242177e-03
## [13,] 12 3.434240e-03
## [14,] 13 1.320862e-03
## [15,] 14 4.717363e-04
## [16,] 15 1.572454e-04
## [17,] 16 4.913920e-05
## [18,] 17 1.445271e-05
## [19,] 18 4.014640e-06
## [20,] 19 1.056484e-06
## [21,] 20 2.641211e-07
## [22,] 21 6.288597e-08
## [23,] 22 1.429227e-08
## [24,] 23 3.107014e-09
```

```
## [25,] 24 6.472947e-10
## [26,] 25 1.294589e-10
## [27,] 26 2.489595e-11
## [28,] 27 4.610361e-12
## [29,] 28 8.232787e-13
## [30,] 29 1.419446e-13
## [31,] 30 2.365743e-14
## [32,] 31 3.815715e-15
## [33,] 32 5.962055e-16
## [34,] 33 9.033417e-17
## [35,] 34 1.328444e-17
## [36,] 35 1.897777e-18
## [37,] 36 2.635801e-19
## [38,] 37 3.561893e-20
## [39,] 38 4.686701e-21
## [40,] 39 6.008592e-22
## [41,] 40 7.510739e-23
## [42,] 41 9.159438e-24
## [43,] 42 1.090409e-24
## [44,] 43 1.267918e-25
## [45,] 44 1.440816e-26
## [46,] 45 1.600906e-27
## [47,] 46 1.740116e-28
## [48,] 47 1.851187e-29
## [49,] 48 1.928320e-30
## [50,] 49 1.967673e-31
## [51,] 50 1.967673e-32
## [52,] 51 1.929091e-33
## [53,] 52 1.854895e-34
## [54,] 53 1.749901e-35
## [55,] 54 1.620279e-36
## [56,] 55 1.472981e-37
## [57,] 56 1.315162e-38
## [58,] 57 1.153650e-39
## [59,] 58 9.945263e-41
## [60,] 59 8.428189e-42
## [61,] 60 7.023491e-43
```

```
y
```

```
##  [1] 6.737947e-03 3.368973e-02 8.422434e-02 1.403739e-01 1.754674e-01
##  [6] 1.754674e-01 1.462228e-01 1.044449e-01 6.527804e-02 3.626558e-02
## [11] 1.813279e-02 8.242177e-03 3.434240e-03 1.320862e-03 4.717363e-04
## [16] 1.572454e-04 4.913920e-05 1.445271e-05 4.014640e-06 1.056484e-06
## [21] 2.641211e-07 6.288597e-08 1.429227e-08 3.107014e-09 6.472947e-10
## [26] 1.294589e-10 2.489595e-11 4.610361e-12 8.232787e-13 1.419446e-13
## [31] 2.365743e-14 3.815715e-15 5.962055e-16 9.033417e-17 1.328444e-17
## [36] 1.897777e-18 2.635801e-19 3.561893e-20 4.686701e-21 6.008592e-22
## [41] 7.510739e-23 9.159438e-24 1.090409e-24 1.267918e-25 1.440816e-26
## [46] 1.600906e-27 1.740116e-28 1.851187e-29 1.928320e-30 1.967673e-31
## [51] 1.967673e-32 1.929091e-33 1.854895e-34 1.749901e-35 1.620279e-36
## [56] 1.472981e-37 1.315162e-38 1.153650e-39 9.945263e-41 8.428189e-42
## [61] 7.023491e-43
```

```r
sum(y)
```

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

```r
dpois(140,5)
```

```
## [1] 3.591023e-146
```

```r
ppois(200,5)
```

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

```r
x=seq(0,3);x
```

```
## [1] 0 1 2 3
```

```r
y=exp(-5)*5^x/factorial(x)
y
```

```
## [1] 0.006737947 0.033689735 0.084224337 0.140373896
```

```r
sum(y)
```

```
## [1] 0.2650259
```

```r
dpois(17,5)
```

```
## [1] 1.445271e-05
```

```r
#exp(-5)*5^17/factorial(17)
#rpois(20, 5)
ppois(2,5)
```

```
## [1] 0.124652
```

```r
ppois(17,5)
```

```
## [1] 0.9999946
```

```r
#~pois(5)=====>p(X>=10)=1-p(x<10)=1-p(x<=9)
1-ppois(9, 5)
```

```
## [1] 0.03182806
```

```r
#


1-ppois(9,5)
```

```
## [1] 0.03182806
```

```r
# P(x=2)=P(x<=2)-P(x<2)
ppois(2,5)-ppois(1,5)
```

```
## [1] 0.08422434
```

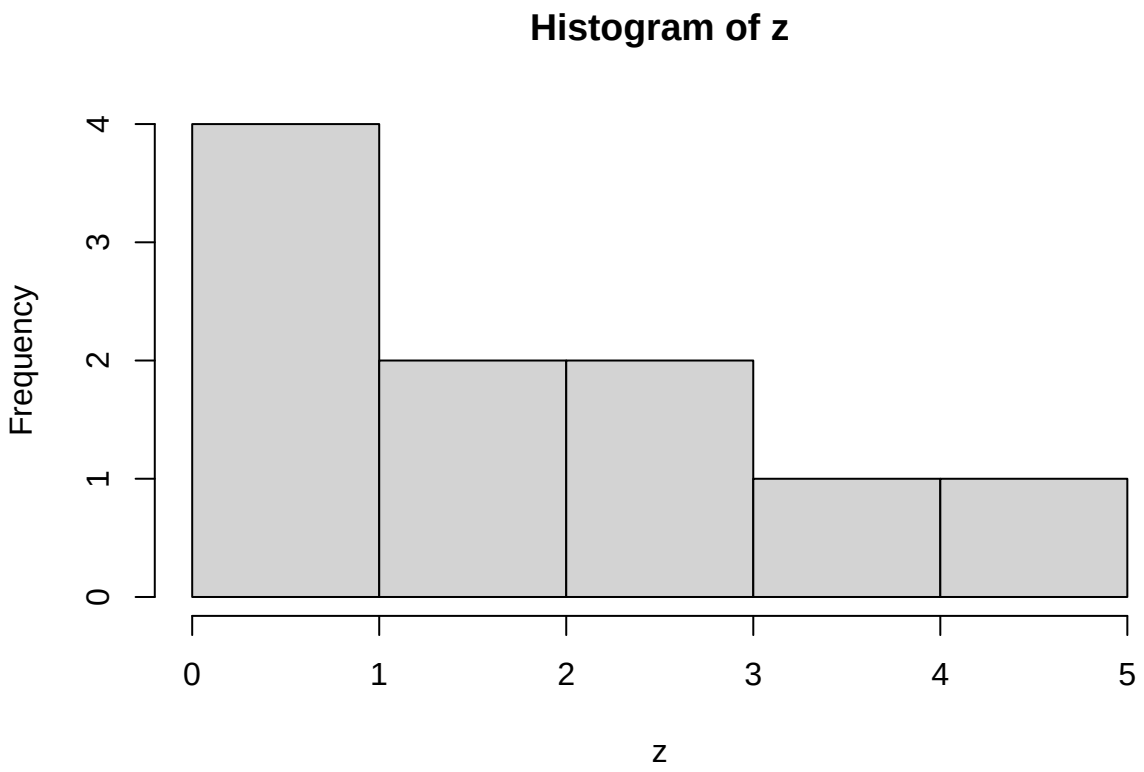
```r
dpois(2,5)
```

```
## [1] 0.08422434
```

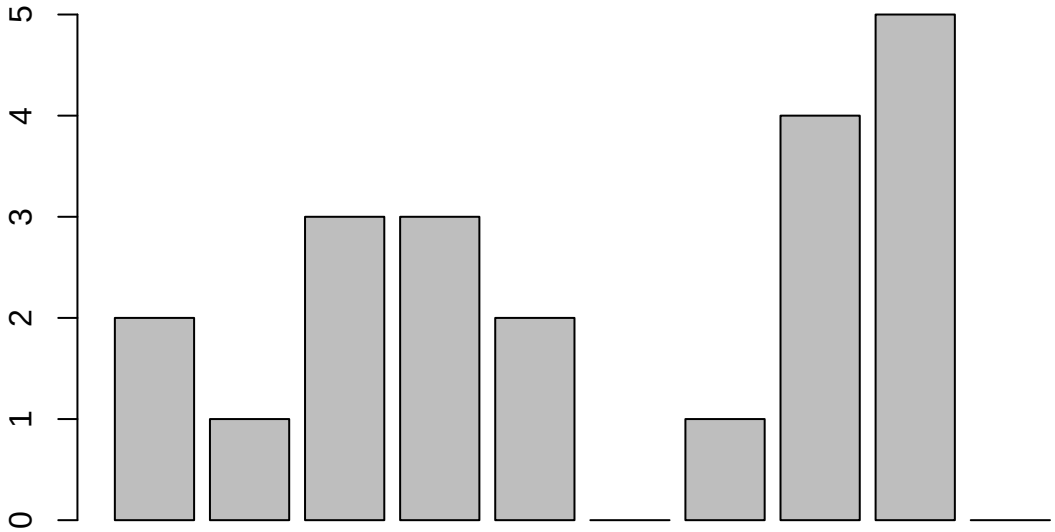
```r
ppois(2,5)-ppois(1,5)
```

```
## [1] 0.08422434
```

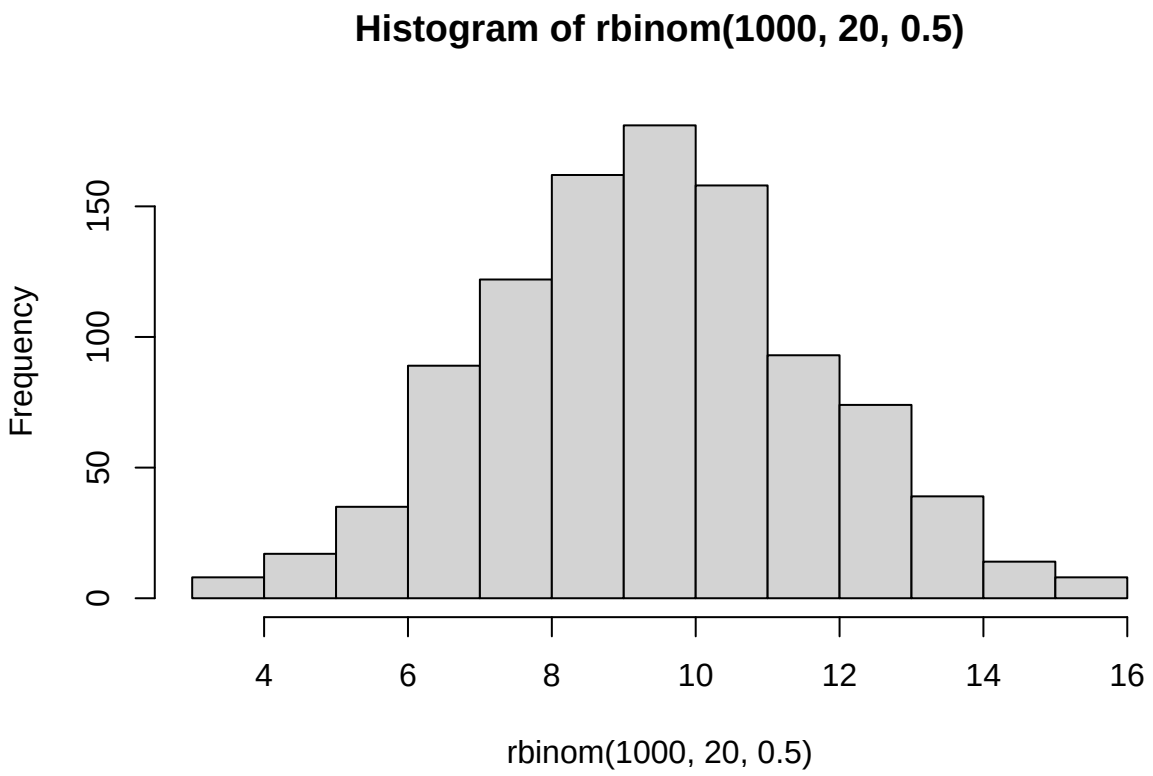
```r
z=rbinom(10, 20, 0.09)
hist(z)
```



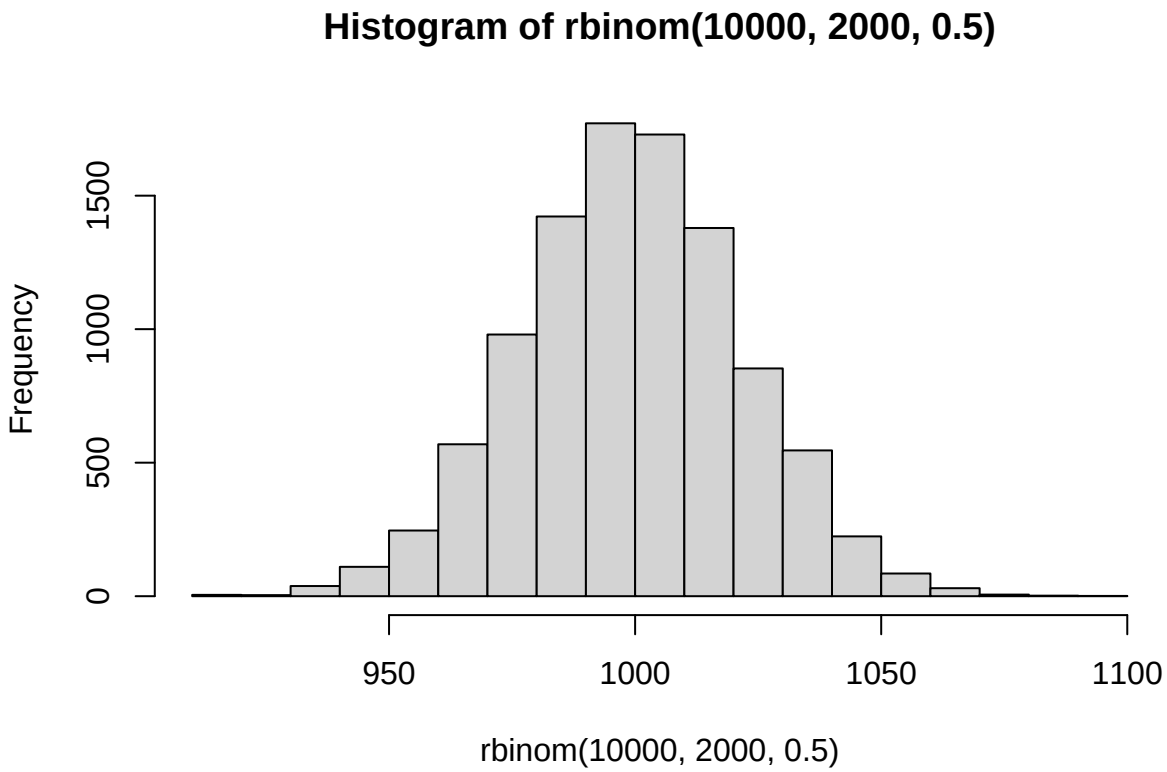

```r
barplot(z)
```




```r
hist(rbinom(1000, 20, .5))
```




```
hist(rbinom(10000, 2000, .5))
```




```
#X~Bin(n=15, p=0.3),  P(X=2)
dbinom(2, 15,0.3)
```

```
## [1] 0.09156011
```

```r
pbinom(2, 15,0.3) #P(X<=2)
```

```
## [1] 0.1268277
```

```r
factorial(15)/(factorial(2)*factorial(13))*0.3^2*0.7^13
```

```
## [1] 0.09156011
```

```r
pbinom(2,15,0.3)#P(X<=2)=p(x=0)+p(x=1)+P(x=2)
```

```
## [1] 0.1268277
```

```r
dbinom(0, 15,0.3)+dbinom(1, 15,0.3)+dbinom(2, 15,0.3)
```

```
## [1] 0.1268277
```

```r
#P(x=5)=p(x<=5)-p(x<5)
dbinom(5,15,0.3)
```

```
## [1] 0.2061304
```

```r
pbinom(5, 15,0.3)-pbinom(4,15,0.3)
```

```
## [1] 0.2061304
```

```r
rbinom(10, 5,0.09)
```

```
##  [1] 0 0 0 0 0 0 2 0 0 1
```

```r
rbinom(5, 10,0.95)
```

```
## [1] 10  9 10 10  9
```

```r
rf(10, 5,6)
```

```
##  [1] 1.0009519 0.9895656 2.7744936 6.2276451 0.5090480 6.3504814 2.3388757
##  [8] 0.6575688 1.8936038 3.5663198
```

```r
rchisq(10,20)
```

```
##  [1] 24.285777 13.303716 21.284252 25.991961 27.177605 22.032197 30.862171
##  [8] 17.006516  6.629091 18.247034
```

```r
dnorm(2)
```

```
## [1] 0.05399097
```

```r
dnorm(2, 1,10)
```

```
## [1] 0.03969525
```

```r
pnorm(2)
```

```
## [1] 0.9772499
```

```r
pnorm(0)
```

```
## [1] 0.5
```

```r
pnorm(150, 150, 10)
```

```
## [1] 0.5
```

```r
pnorm(6)
```

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

```
pnorm(-2)
```

```
## [1] 0.02275013
```

```
pnorm(9, 5, 4)# X~N(5, 4)  P(X<9)=P[(X-5)/4  <(9-5)/4]=P(Z<1)
```

```
## [1] 0.8413447
```

```
pnorm(1)
```

```
## [1] 0.8413447
```

```
dnorm(1)
```

```
## [1] 0.2419707
```

```
pnorm(1)-pnorm(0.25)
```

```
## [1] 0.2426384
```

```
pnorm(1,0,1)
```

```
## [1] 0.8413447
```

```
dt(2, 5)
```

```
## [1] 0.06509031
```

```
pt(-2,5)
```

```
## [1] 0.05096974
```

```
1-pt(2,5)
```

```
## [1] 0.05096974
```