

기말고사

문주현(202013919)

12/21/2021

1번 문제풀이

(1)

```
i<-1:1000  
t<-2*pi*i/1000  
head(t)
```

```
## [1] 0.006283185 0.012566371 0.018849556 0.025132741 0.031415927 0.037699112
```

```
e<-rnorm(t)
```

(2)

```
x1<-c()  
x2<-c()  
for(i in 1:1000){  
  x1[i]<-sin(2*pi*i/1000)  
}  
for(i in 1:1000){  
  x2[i]<-cos(8*pi*i/1000)  
}  
head(x1)
```

```
## [1] 0.006283144 0.012566040 0.018848440 0.025130095 0.031410759 0.037690183
```

```
head(x2)
```

```
## [1] 0.9996842 0.9987370 0.9971589 0.9949510 0.9921147 0.9886517
```

(3)

```
y<-c()  
for(i in 1:1000){  
  y[i]<-1.5+5*x1[i]+3*x2[i]+e[i]
```

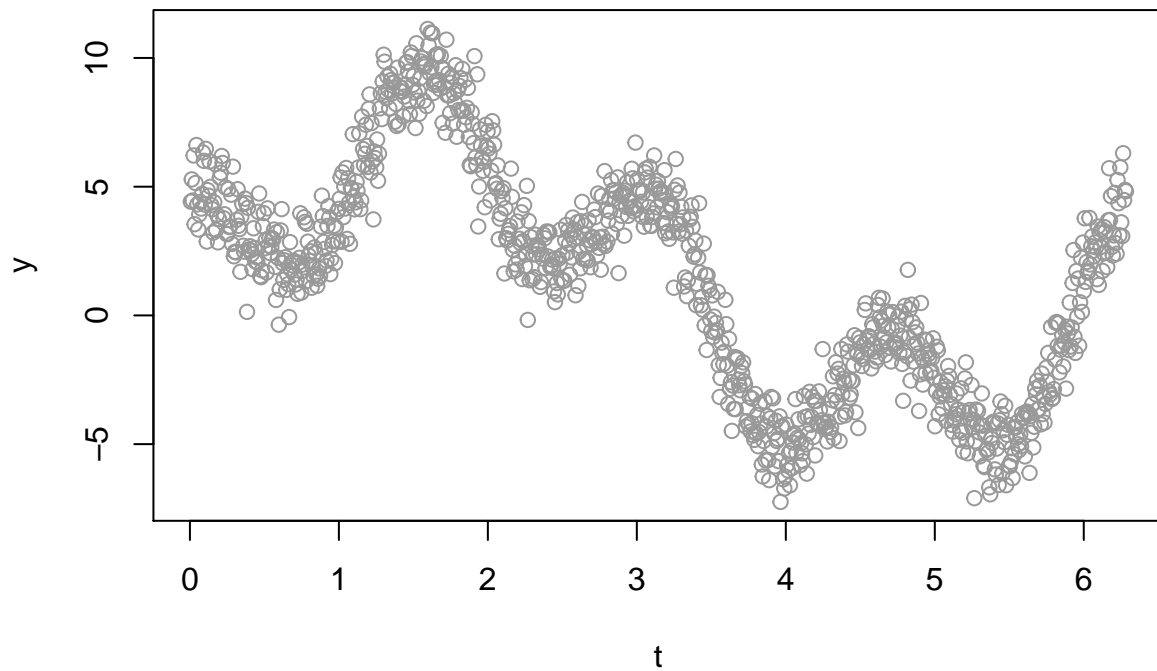
```

}
head(y)

## [1] 4.417727 5.283294 4.461564 6.211524 3.543166 5.143545

plot(t,y,col='gray60')

```



(4)

```

X<-rep(0,1000*3)
dim(X)<-c(1000,3)
x3<-rep(1,1000)
cbind(x3[,1],x1[,1],x2[,1])

##      [,1]      [,2]      [,3]
## [1,]    1 0.006283144 0.9996842

for(i in 1:1000){
  X[i,]<-cbind(x3[i],x1[i],x2[i])
}
head(X)

##      [,1]      [,2]      [,3]

```

```
## [1,] 1 0.006283144 0.9996842
## [2,] 1 0.012566040 0.9987370
## [3,] 1 0.018848440 0.9971589
## [4,] 1 0.025130095 0.9949510
## [5,] 1 0.031410759 0.9921147
## [6,] 1 0.037690183 0.9886517
```

(5)

```
b<-rbind(1.5,5,3)
```

```
b
```

```
##      [,1]
## [1,] 1.5
## [2,] 5.0
## [3,] 3.0
```

```
Xb<-X %*% b
```

```
head(Xb)
```

```
##      [,1]
## [1,] 4.530468
## [2,] 4.559041
## [3,] 4.585719
## [4,] 4.610504
## [5,] 4.633398
## [6,] 4.654406
```

```
tail(Xb)
```

```
##      [,1]
## [995,] 4.319290
## [996,] 4.359203
## [997,] 4.397235
## [998,] 4.433381
## [999,] 4.467637
## [1000,] 4.500000
```

```
head(t)
```

```
## [1] 0.006283185 0.012566371 0.018849556 0.025132741 0.031415927 0.037699112
```

```
head(y)
```

```
## [1] 4.417727 5.283294 4.461564 6.211524 3.543166 5.143545
```

```
ty<-rep(0,1000*2)
```

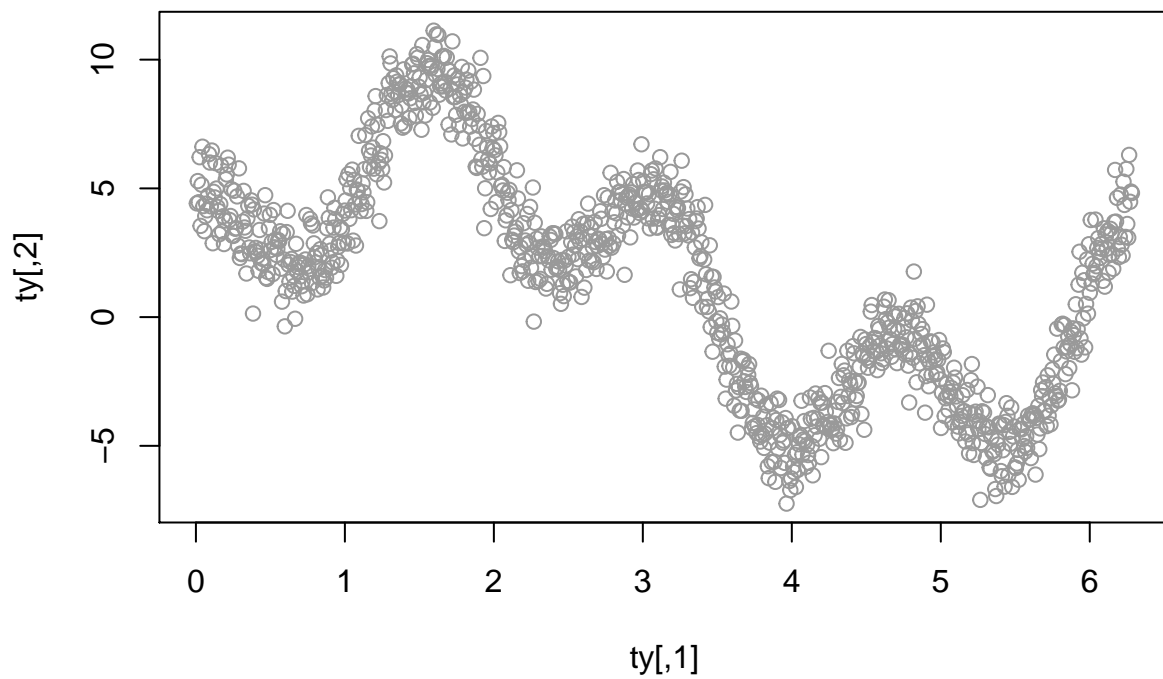
```
dim(ty)<-c(1000,2)
```

```
for(i in 1:1000){
  ty[i,]<-c(t[i],y[i])
}
```

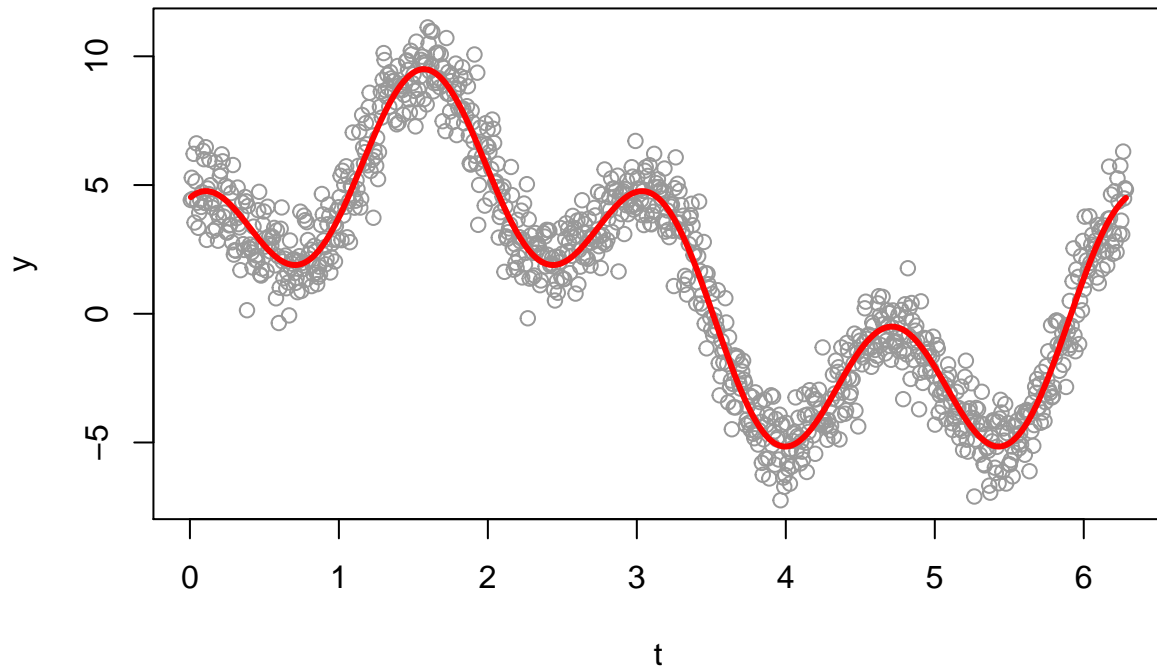
```
head(ty)
```

```
##           [,1]      [,2]
## [1,] 0.006283185 4.417727
## [2,] 0.012566371 5.283294
## [3,] 0.018849556 4.461564
## [4,] 0.025132741 6.211524
## [5,] 0.031415927 3.543166
## [6,] 0.037699112 5.143545
```

```
plot(ty,col='gray60')
```



```
plot(t,y,col='gray60')
lines(t,Xb,col='red',lwd=3)
```



(6)

```
os<- t(X)
bb<-solve(os %*% X) %*% os %*% y
bb
```

```
##          [,1]
## [1,]  1.475611
## [2,]  5.075282
## [3,]  2.972585
```

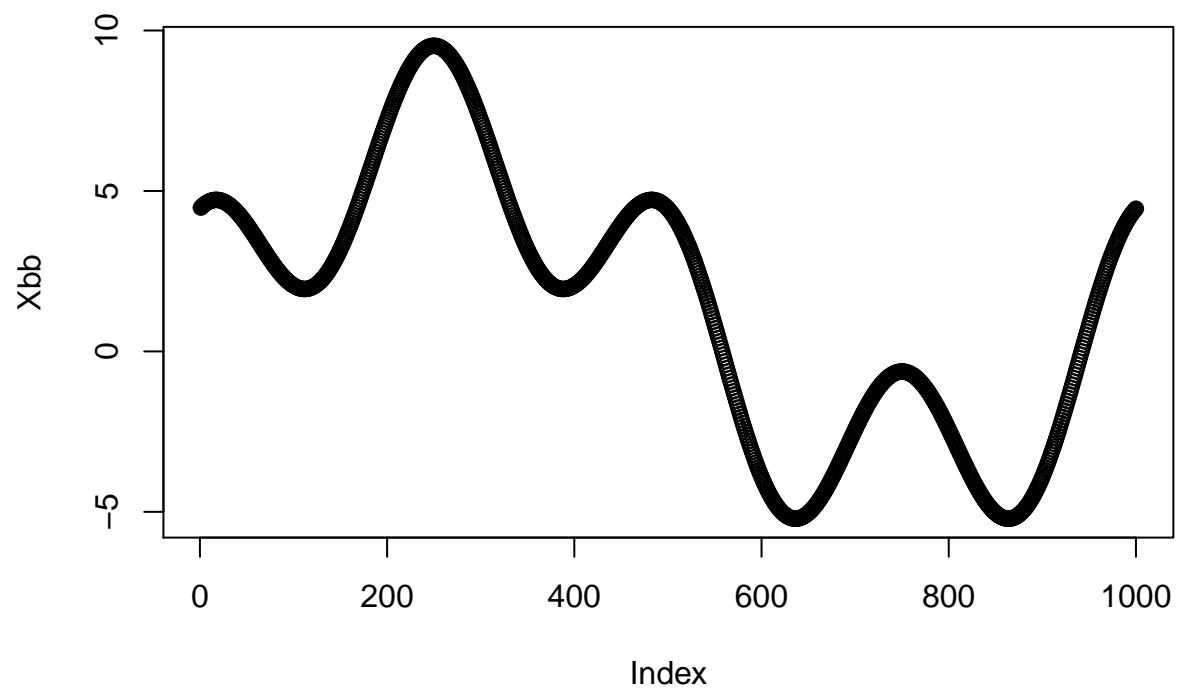
```
b
```

```
##          [,1]
## [1,]  1.5
## [2,]  5.0
## [3,]  3.0
```

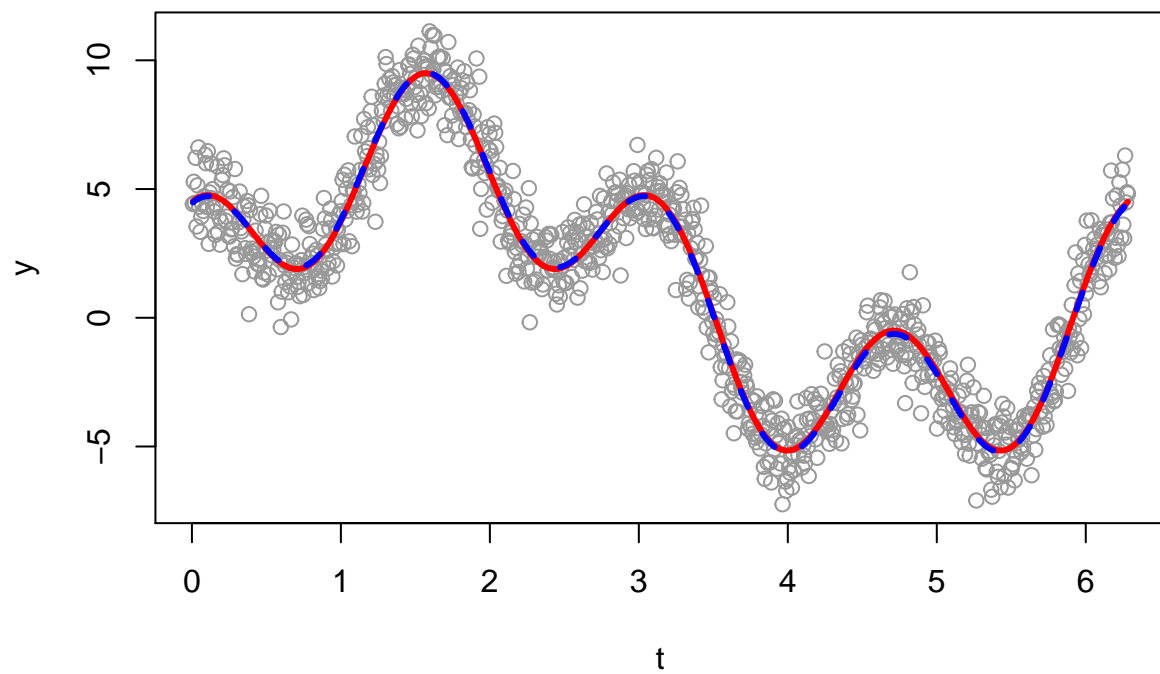
- 아주 조금 다르다(거의 비슷)

(7)

```
Xbb<-X %*% bb  
plot(Xbb)
```



```
plot(t,y,col='gray60')  
lines(t,Xb,col='red',lwd=3)  
lines(t,Xbb,col='blue',lty=2,lwd=3)
```

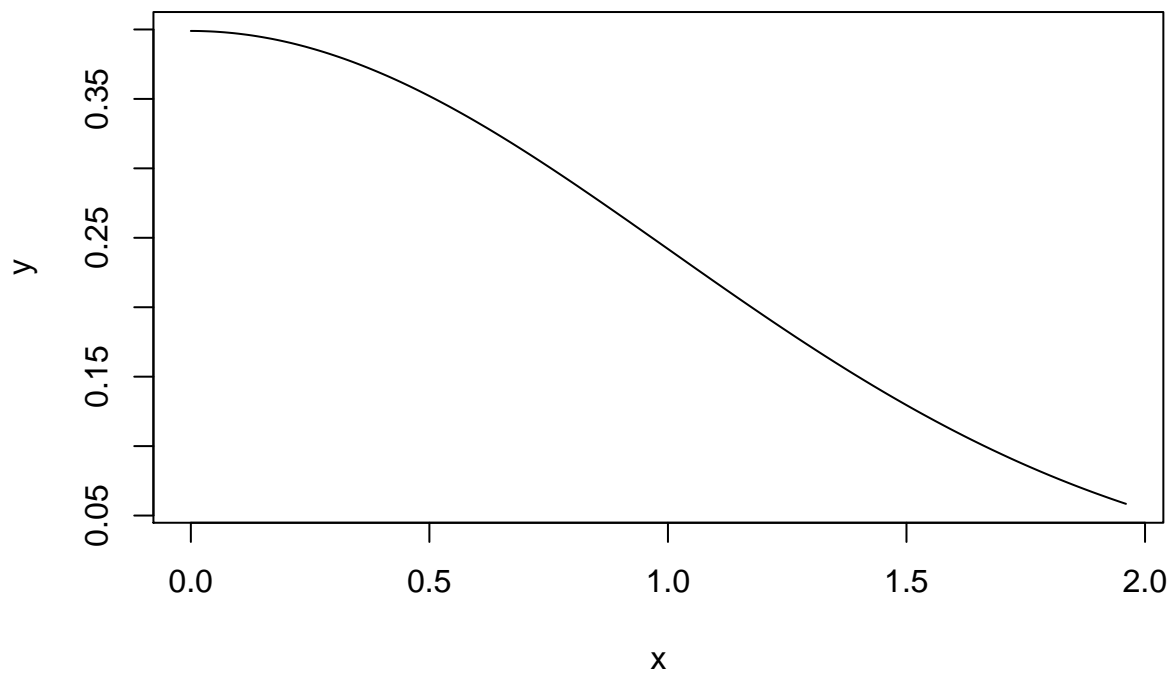


2번 문제풀이

(1)

```
x<-seq(0,1.96,0.01)
y<-(1/sqrt(2*pi))*exp((-1/2)*x^2)

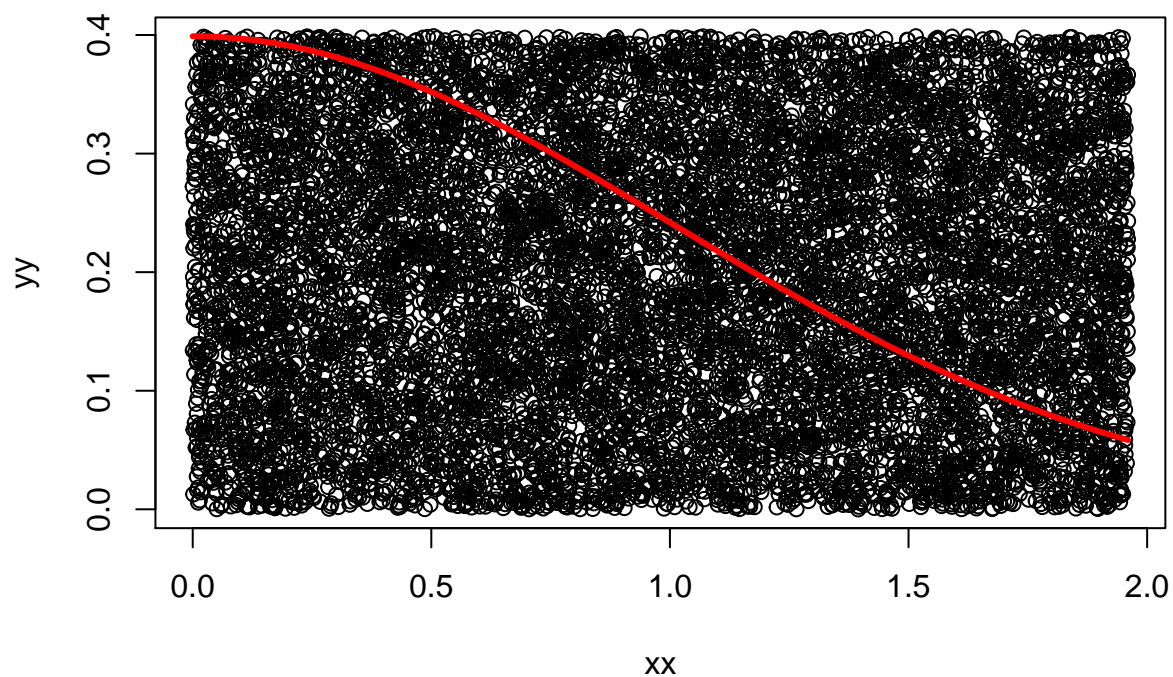
plot(x,y,type='l')
```



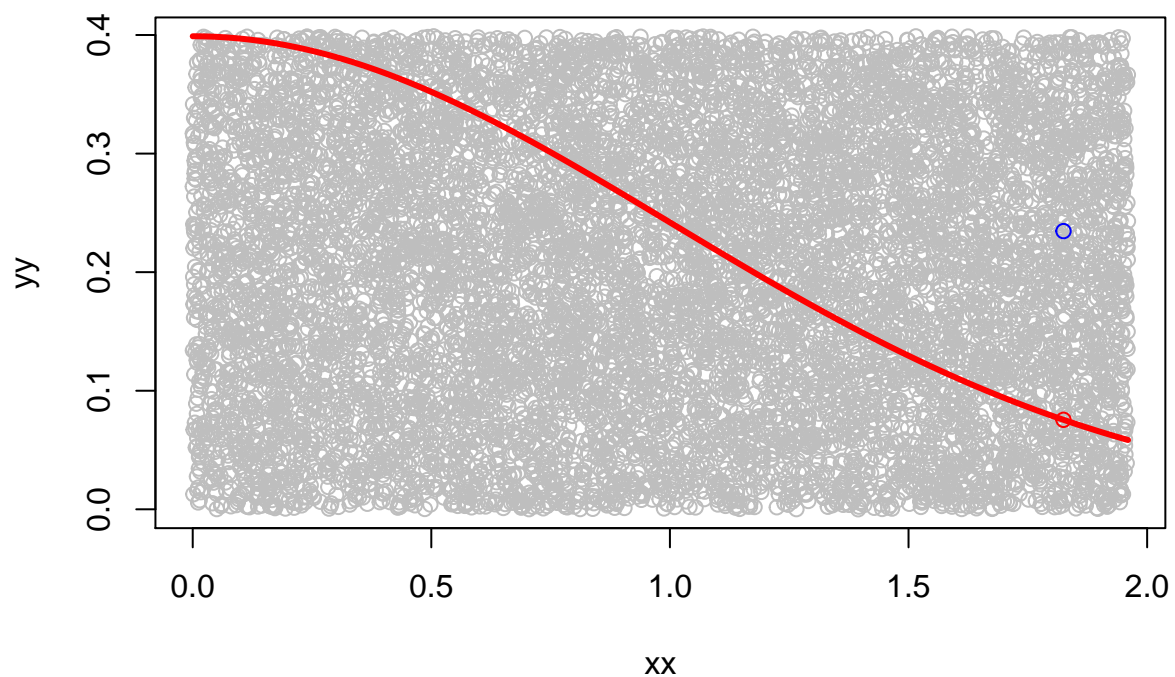
```
xx<-runif(10000)*1.96
yy<-runif(10000)*0.3989423

plot(xx,yy)

lines(x,y,col='red',lwd=3)
```

```
test<-function(xx,yy){  
  yy< (1/sqrt(2*pi))*exp((-1/2)*xx^2)  
}  
  
plot(xx,yy,col='gray')  
lines(x,y,col='red',lwd=3)  
points(xx[1],yy[1],col='blue')  
points(xx[1],(1/sqrt(2*pi))*exp((-1/2)*xx[1]^2),col='red')
```



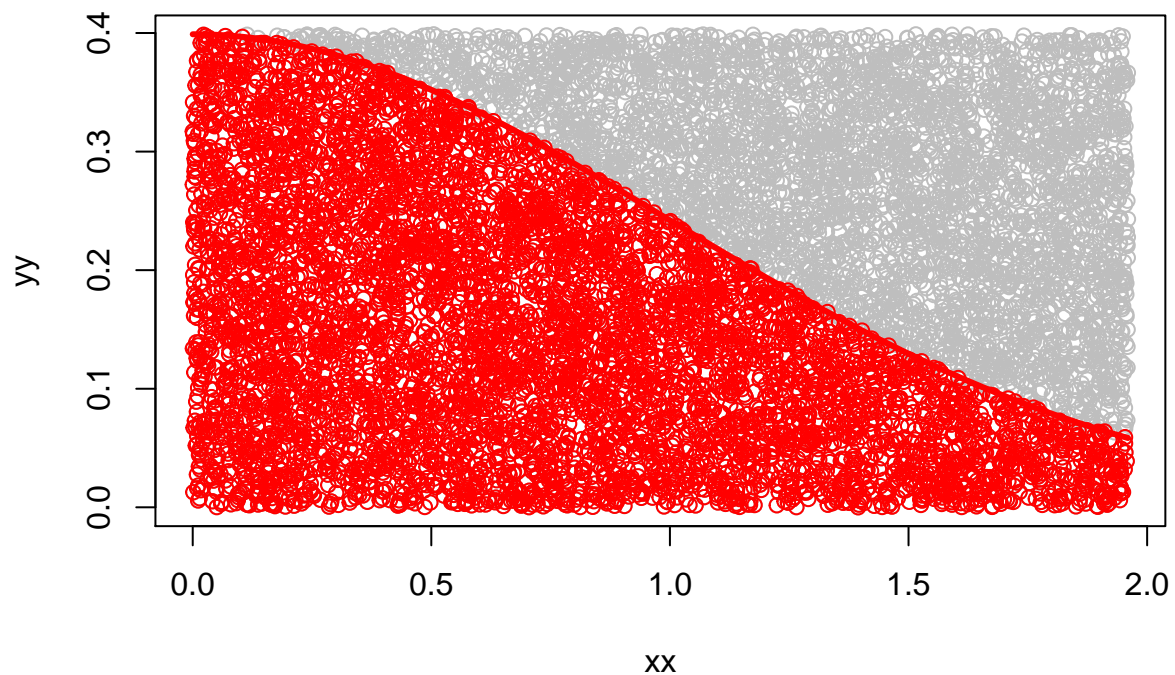
```
tst<-c()

for(i in 1:10000){
  tst[i]<-test(xx[i],yy[i])
}

head(tst)

## [1] FALSE FALSE TRUE TRUE FALSE TRUE

plot(xx,yy,col='gray')
lines(x,y,col='red',lwd=3)
points(xx[tst],yy[tst],col='red')
```



```
sum(tst)
```

```
## [1] 5995
```

```
s<-0.4*2*sum(tst)*2*2/10000
```

```
s
```

```
## [1] 1.9184
```

- 양수인 부분 즉, 한쪽만 계산해줬기 때문에 두 배를 해줘야 한다.

(2)

```
ra<-rnorm(1000)
```

```
min(ra)
```

```
## [1] -3.53908
```

```
max(ra)
```

```
## [1] 3.708121
```

```
big<-sum(ra > 1.96)
```

```
small<-sum(ra < -1.96)
```

```
1000-big-small
```

[1] 959

3번 문제풀이

TYPE A

- 변수들 모음

```
apr<-c("n1","n2","n3","n4","n5","n6","n7","n8","n9","10")
apr
```

```
## [1] "n1" "n2" "n3" "n4" "n5" "n6" "n7" "n8" "n9" "10"
```

```
surv=10
player=apr[surv]
player
```

```
## [1] "10"
```

```
prob=0.5
stage=0
tossrslt=NA
```

- 함수들 모음

```
library(tidyverse)
```

```
## -- Attaching packages ----- tidyverse 1.3.1 --
```

```
## v ggplot2 3.3.5      v purrr   0.3.4
## v tibble  3.1.6      v dplyr   1.0.7
## v tidyr   1.1.4      v stringr 1.4.0
## v readr   2.1.1      v forcats 0.5.1
```

```
## -- Conflicts ----- tidyverse_conflicts() --
```

```
## x dplyr::filter() masks stats::filter()
## x dplyr::lag()     masks stats::lag()
```

```
toss=function(p){
  rbinom(n=1,size=1,prob=p)
} %>% as.logical
```

```
tossrslt=toss(prob)
if(tossrslt==TRUE){
  surv=surv
  stage=stage+1
  player=apr[surv]
}else{
  surv=surv-1
  stage=stage+1
  player=apr[surv]
```

```

}

reset=function(){
  tossrslt<-NA
  surv<-10
  stage<-0
  player<-apr[surv]
}

record=function() list(pre_tossrslt=tossrslt,surv=surv,stage=stage,player=player)

go=function(){
  prob<-0.5+(player=='n9')*0.45
  tossrslt<-toss(prob)
  if(tossrslt==FALSE){
    surv<-surv-1
    stage<-stage+1
    player<-apr[surv]
  }
}

gogo = function(){
  for(i in 1:20){
    go()
  }
}

gogo_his=function(){
  rslt_=as_tibble(record())
  for(i in 1:20){
    go()
    rslt_=rbind(rslt_,as_tibble(record()))
  }
  print(rslt_)
}

prob=0.5+(player=='n9')*0.45
tossrslt=toss(prob)
if(tossrslt==FALSE) {surv=surv-1
stage=stage+1
player=apr[surv]
}

```

- reset()과 record()과정을 10번 반복해주고 사는 확률 알아보기 - 21번째의 값이 8보다 크다는 의미는 1~8번(경우1), 1~9번(경우2), 1~10번(경우3) 살아남았다는 의미

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
one<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 TRUE          10     0 10
## 3 FALSE         9     1 n9
## 4 TRUE          9     1 n9
## 5 TRUE          9     1 n9
## 6 TRUE          9     1 n9
## 7 TRUE          9     1 n9
## 8 TRUE          9     1 n9
## 9 TRUE          9     1 n9
## 10 TRUE         9     1 n9
## # ... with 11 more rows
```

```
one_tf<-one $ surv [21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
```

```
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
two<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 TRUE         10     0 10
## 3 TRUE         10     0 10
## 4 TRUE         10     0 10
## 5 TRUE         10     0 10
## 6 TRUE         10     0 10
## 7 TRUE         10     0 10
## 8 FALSE         9     1 n9
## 9 TRUE          9     1 n9
## 10 TRUE          9     1 n9
## # ... with 11 more rows
```

```
two_tf<-two $ surv [21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
thr<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 TRUE         10     0 10
```



```
## 3 FALSE          9      1 n9
## 4 TRUE           9      1 n9
## 5 TRUE           9      1 n9
## 6 TRUE           9      1 n9
## 7 TRUE           9      1 n9
## 8 TRUE           9      1 n9
## 9 TRUE           9      1 n9
## 10 TRUE          9      1 n9
## # ... with 11 more rows
```

```
thr_tf<-thr $ surv [21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
four<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10      0 10
## 2 FALSE        9      1 n9
## 3 TRUE         9      1 n9
## 4 TRUE         9      1 n9
## 5 TRUE         9      1 n9
## 6 TRUE         9      1 n9
## 7 TRUE         9      1 n9
## 8 TRUE         9      1 n9
## 9 TRUE         9      1 n9
## 10 TRUE        9      1 n9
## # ... with 11 more rows
```

```
four_tf<-four $ surv [21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
five<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 FALSE         9     1 n9
## 3 TRUE          9     1 n9
## 4 TRUE          9     1 n9
## 5 TRUE          9     1 n9
## 6 TRUE          9     1 n9
## 7 TRUE          9     1 n9
## 8 TRUE          9     1 n9
## 9 TRUE          9     1 n9
## 10 TRUE         9     1 n9
## # ... with 11 more rows
```

```
five_tf<-five $ surv [21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
```

```
## $player
## [1] "10"
```

```
six<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 TRUE         10     0 10
## 3 TRUE         10     0 10
## 4 FALSE        9     1 n9
## 5 TRUE         9     1 n9
## 6 TRUE         9     1 n9
## 7 TRUE         9     1 n9
## 8 TRUE         9     1 n9
## 9 TRUE         9     1 n9
## 10 TRUE        9     1 n9
## # ... with 11 more rows
```

```
six_tf<-six $ surv[21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
seven<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10     0 10
## 2 FALSE        9     1 n9
## 3 TRUE         9     1 n9
## 4 TRUE         9     1 n9
```

```
## 5 TRUE          9      1 n9
## 6 TRUE          9      1 n9
## 7 TRUE          9      1 n9
## 8 TRUE          9      1 n9
## 9 TRUE          9      1 n9
## 10 TRUE         9      1 n9
## # ... with 11 more rows
```

```
seven_tf<-seven $ surv[21] >=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
eight<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10      0 10
## 2 TRUE         10      0 10
## 3 TRUE         10      0 10
## 4 FALSE         9      1 n9
## 5 TRUE          9      1 n9
## 6 TRUE          9      1 n9
## 7 TRUE          9      1 n9
## 8 TRUE          9      1 n9
## 9 TRUE          9      1 n9
## 10 TRUE         9      1 n9
## # ... with 11 more rows
```

```
eight_tf<-eight$surv[21]>=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
nine<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>      <dbl> <dbl> <chr>
## 1 NA          10     0 10
## 2 FALSE        9     1 n9
## 3 TRUE         9     1 n9
## 4 TRUE         9     1 n9
## 5 TRUE         9     1 n9
## 6 TRUE         9     1 n9
## 7 TRUE         9     1 n9
## 8 TRUE         9     1 n9
## 9 TRUE         9     1 n9
## 10 TRUE        9     1 n9
## # ... with 11 more rows
```

```
nine_tf<-nine$surv[20]>=8
```

```
reset()
record()
```

```
## $pre_tossrslt
## [1] NA
##
## $surv
## [1] 10
##
## $stage
## [1] 0
##
## $player
## [1] "10"
```

```
ten<-gogo_his()
```

```
## # A tibble: 21 x 4
##   pre_tossrslt  surv stage player
##   <lgl>         <dbl> <dbl> <chr>
## 1 NA           10      0 10
## 2 FALSE         9       1 n9
## 3 TRUE          9       1 n9
## 4 TRUE          9       1 n9
## 5 TRUE          9       1 n9
## 6 TRUE          9       1 n9
## 7 TRUE          9       1 n9
## 8 TRUE          9       1 n9
## 9 TRUE          9       1 n9
## 10 TRUE         9       1 n9
## # ... with 11 more rows
```

```
ten_tf<-ten$surv[21]>=8
```

```
ss<-sum(one_tf,two_tf,thr_tf,four_tf,five_tf,six_tf,seven_tf,eight_tf,nine_tf,ten_tf)
ss/10
```

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

TYPE B

```
surv_10<-0.5^20
surv_9<-0.5*0.5^(19)*(factorial(20)/(factorial(19)*factorial(1)))
surv_8<-0.5^(2)*0.5^(18)*(factorial(20)/(factorial(18)*factorial(2)))
surv_7<-0.5^(3)*0.5^(17)*(factorial(20)/(factorial(17)*factorial(3)))
surv_6<-0.5^(4)*0.5^(16)*(factorial(20)/(factorial(16)*factorial(4)))
surv_5<-0.5^(5)*0.5^(15)*(factorial(20)/(factorial(15)*factorial(5)))
surv_4<-0.5^(6)*0.5^(14)*(factorial(20)/(factorial(14)*factorial(6)))
surv_3<-0.5^(7)*0.5^(13)*(factorial(20)/(factorial(13)*factorial(7)))
sum(surv_10,surv_9,surv_8,surv_7,surv_6,surv_5,surv_4,surv_3)
```

```
## [1] 0.131588
```

- 결국 타입A에서 8번 참가자가 살 확률이 높다.

4번 문제풀이

(1)

```
install.packages("readr",repos="http://cran.us.r-project.org")
```

```
## Warning: package 'readr' is in use and will not be installed
```

```
library(readr)
```

```
abc=read_csv('https://raw.githubusercontent.com/guebin/2021IR/master/_notebooks/covid19.
```

```
## Rows: 12294 Columns: 5
```

```
## -- Column specification -----
```

```
## Delimiter: ","
```

```
## chr (1): prov
```

```
## dbl (4): year, month, day, cases
```

```
##
```

```
## i Use `spec()` to retrieve the full column specification for this data.
```

```
## i Specify the column types or set `show_col_types = FALSE` to quiet this message.
```

```
head(abc)
```

```
## # A tibble: 6 x 5
```

```
##   year month   day prov  cases
```

```
##   <dbl> <dbl> <dbl> <chr> <dbl>
```

```
## 1  2020     1    20 서울     0
```

```
## 2  2020     1    20 부산     0
```

```
## 3  2020     1    20 대구     0
```

```
## 4  2020     1    20 인천     1
```

```
## 5  2020     1    20 광주     0
```

```
## 6  2020     1    20 대전     0
```

```
subset(abc,select=c(year,cases))
```

```
## # A tibble: 12,294 x 2
```

```
##   year cases
```

```
##   <dbl> <dbl>
```

```
## 1  2020     0
```

```
## 2  2020     0
```

```
## 3  2020     0
```

```
## 4  2020     1
```

```
## 5  2020     0
```

```
## 6  2020     0
```

```
## 7  2020     0
```

```
## 8  2020     0
```

```
## 9  2020     0
```

```
## 10 2020     0
```

```
## # ... with 12,284 more rows
```

```
abc2020<-subset(abc,subset=year==2020)
head(abc2020)
```

```
## # A tibble: 6 x 5
```

```
##   year month   day prov  cases
##   <dbl> <dbl> <dbl> <chr> <dbl>
## 1  2020     1    20 서울     0
## 2  2020     1    20 부산     0
## 3  2020     1    20 대구     0
## 4  2020     1    20 인천     1
## 5  2020     1    20 광주     0
## 6  2020     1    20 대전     0
```

```
nrow(abc2020)
```

```
## [1] 6246
```

```
abccase2020<-subset(abc2020,select=cases)
sum(abccase2020)
```

```
## [1] 60726
```

```
abc2021<-subset(abc,subset=year==2021)
abc2021
```

```
## # A tibble: 6,048 x 5
```

```
##   year month   day prov  cases
##   <dbl> <dbl> <dbl> <chr> <dbl>
## 1  2021     1     1 서울   357
## 2  2021     1     1 부산    57
## 3  2021     1     1 대구    43
## 4  2021     1     1 인천    65
## 5  2021     1     1 광주    17
## 6  2021     1     1 대전    11
## 7  2021     1     1 울산    43
## 8  2021     1     1 세종     1
## 9  2021     1     1 경기   284
## 10 2021     1     1 강원    30
## # ... with 6,038 more rows
```

```
nrow(abc2021)
```

```
## [1] 6048
```

```
abccase2021<-subset(abc2021,select=cases)
sum(abccase2021)
```

```
## [1] 396886
```


- 2020년 확진자 수 : 60726명
- 2021년 확진자 수 : 396886명

(2)

```
library(tidyverse)
abc215<-abc2020 %>% subset(month==2 & day <=15)
tail(abc215)
```

```
## # A tibble: 6 x 5
##   year month   day prov  cases
##   <dbl> <dbl> <dbl> <chr> <dbl>
## 1  2020     2    15 전북     0
## 2  2020     2    15 전남     0
## 3  2020     2    15 경북     0
## 4  2020     2    15 경남     0
## 5  2020     2    15 제주     0
## 6  2020     2    15 검역     0
```

```
head(abc$prov)
```

```
## [1] "서울" "부산" "대구" "인천" "광주" "대전"
```

```
seoul<-abc215 %>% subset(prov=="서울")
busan<-abc215 %>% subset(prov=="부산")
daedu<-abc215 %>% subset(prov=="대구")
incheon<-abc215 %>% subset(prov=="인천")
gwanju<-abc215 %>% subset(prov=="광주")
daejeon<-abc215 %>% subset(prov=="대전")
ulsan<-abc215 %>% subset(prov=="울산")
sejong<-abc215 %>% subset(prov=="세종")
gyeonggi<-abc215 %>% subset(prov=="경기")
gangwon<-abc215 %>% subset(prov=="강원")
chungbuk<-abc215 %>% subset(prov=="충북")
cnungnam<-abc215 %>% subset(prov=="충남")
jeonbuk<-abc215 %>% subset(prov=="전북")
jeonnam<-abc215 %>% subset(prov=="전남")
gyeongbuk<-abc215 %>% subset(prov=="경북")
gyeongnam<-abc215 %>% subset(prov=="경남")
jeju<-abc215 %>% subset(prov=="제주")
sum215<-c(sum(seoul $ cases),sum(busan $ cases),sum(daedu $ cases),
           sum(incheon $ cases),sum(gwanju $ cases),sum(daejeon $ cases),
           sum(ulsan $ cases),sum(sejong $ cases),sum(gyeonggi $ cases),
           sum(gangwon $ cases),sum(chungbuk $ cases),sum(cnungnam $ cases),
           sum(jeonbuk $ cases),sum(jeonnam $ cases),sum(gyeongbuk $ cases),
```

```
sum(gyeongnam $ cases),sum(jeju $ cases))
max(sum215)
```

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

```
sum215==9
```

```
## [1] FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE TRUE FALSE FALSE FALSE
## [13] FALSE FALSE FALSE FALSE FALSE
```

- 2021/02/01~02/15 동안 가장 많은 확진자가 발견된 지역은 경기도이다.

(3)

```
library(tidyverse)
abc229<-abc2020 %>% subset(month==2 & day > 15)
tail(abc229)
```

```
## # A tibble: 6 x 5
##   year month   day prov  cases
##   <dbl> <dbl> <dbl> <chr> <dbl>
## 1  2020     2    29 전북     0
## 2  2020     2    29 전남     1
## 3  2020     2    29 경북    75
## 4  2020     2    29 경남    13
## 5  2020     2    29 제주     0
## 6  2020     2    29 검역     0
```

```
head(abc$prov)
```

```
## [1] "서울" "부산" "대구" "인천" "광주" "대전"
```

```
seoul<-abc229 %>% subset(prov=="서울")
busan<-abc229 %>% subset(prov=="부산")
daedu<-abc229 %>% subset(prov=="대구")
incheon<-abc229 %>% subset(prov=="인천")
gwanju<-abc229 %>% subset(prov=="광주")
daejeon<-abc229 %>% subset(prov=="대전")
ulsan<-abc229 %>% subset(prov=="울산")
sejong<-abc229 %>% subset(prov=="세종")
gyeonggi<-abc229 %>% subset(prov=="경기")
gangwon<-abc229 %>% subset(prov=="강원")
chungbuk<-abc229 %>% subset(prov=="충북")
cnungnam<-abc229 %>% subset(prov=="충남")
jeonbuk<-abc229 %>% subset(prov=="전북")
jeonnam<-abc229 %>% subset(prov=="전남")
gyeongbuk<-abc229 %>% subset(prov=="경북")
```

```

gyeongnam<-abc229 %>% subset(prov=="경남")
jeju<-abc229 %>% subset(prov=="제주")
sum229<-c(sum(seoul $ cases),sum(busan $ cases),sum(daedu $ cases),
          sum(incheon $ cases),sum(gwanju $ cases),sum(daejeon $ cases),
          sum(ulsan $ cases),sum(sejong $ cases),sum(gyeonggi $ cases),
          sum(gangwon $ cases),sum(chungbuk $ cases),sum(cnunngnam $ cases),
          sum(jeonbuk $ cases),sum(jeonnam $ cases),sum(gyeongbuk $ cases),
          sum(gyeongnam $ cases),sum(jeju $ cases))
max(sum229)

## [1] 2055

sum229==2055

## [1] FALSE FALSE TRUE FALSE FALSE FALSE FALSE FALSE FALSE FALSE FALSE
## [13] FALSE FALSE FALSE FALSE FALSE

- 2021/02/16~02/29 동안 가장 많은 확진자가 발견된 지역은 대구이다.

```