HW1

Amosov Artem

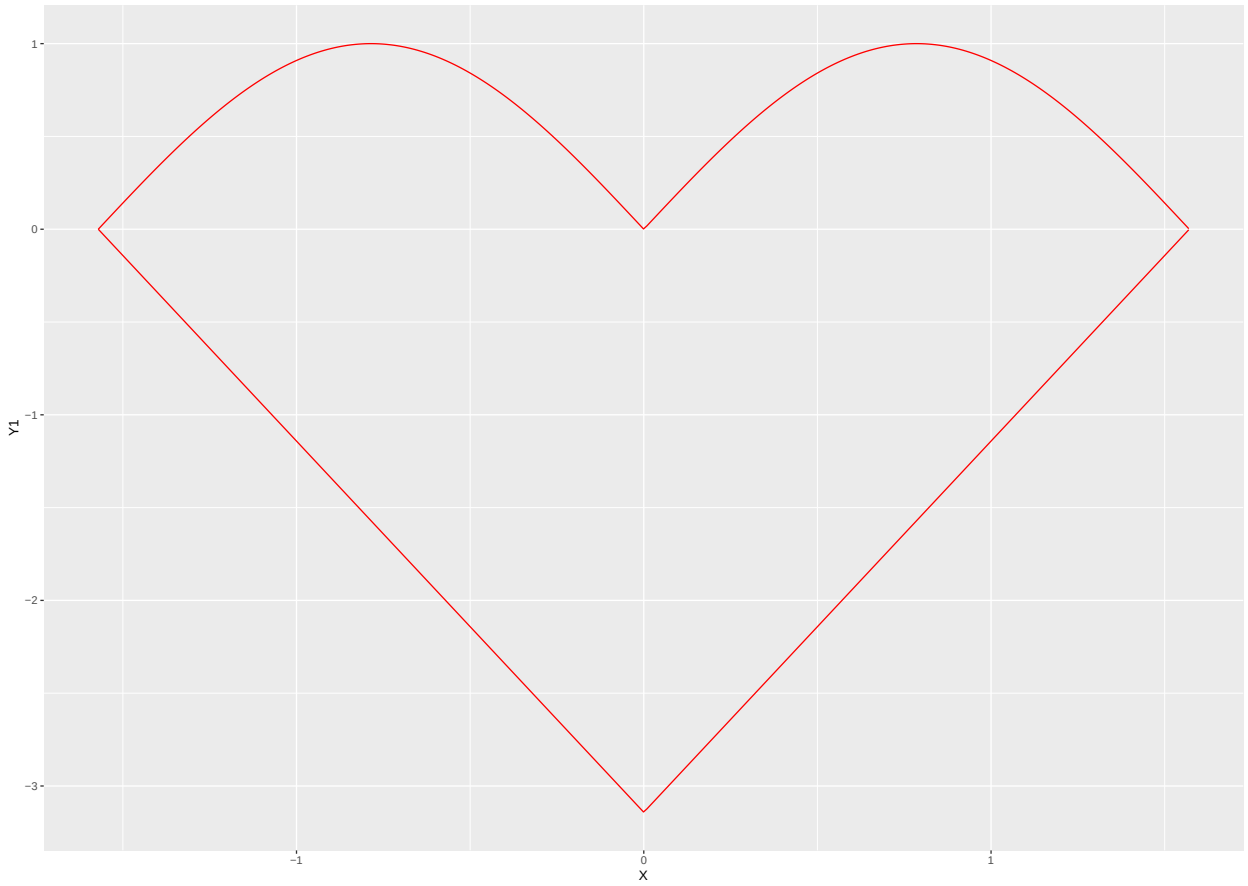
04 04 2022

```
library(ggplot2)
library(sp)
```

Task: find the area of a figure bounded by curves given by the equation:

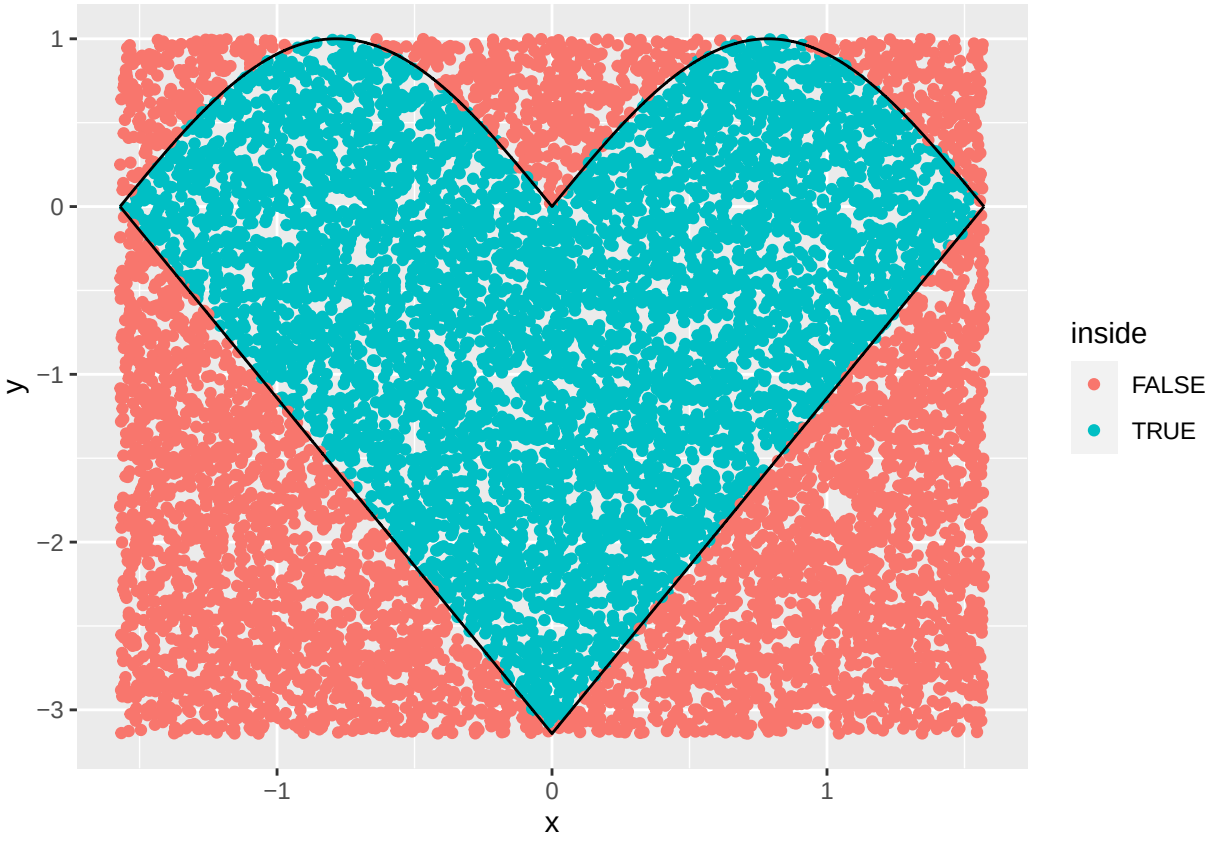
$$y = 2|x| - \pi, x \in [-\frac{pi}{2}, \frac{pi}{2}]$$

$$y = |sin(2x)|, x \in [-\frac{pi}{2}, \frac{pi}{2}]$$



Generation of random points

```
coords <- function(){
  x <- runif(10000, min = -pi/2, max = pi/2)
  y <- runif(10000, min = -pi, max = 1)
  Y1 <- abs(sin(2*x))
  Y2 <- 2*abs(x) - pi
  inside <- (y<Y1)&(y>Y2)
  df2 <- data.frame(x, y,inside, Y1, Y2)
  df2
}
points <- coords()
ggplot(points, aes(x))+
  geom_point(aes(x,y, col = inside))+
  geom_line(aes(x,Y1), color = 'black')+
  geom_line(aes(x,Y2), color = 'black')
```



Counting area

```
inside <- nrow(points[points$inside == T,])
area <- pi*(pi+1)*(inside/10000)
area
```

```
## [1] 6.94928
```