1a)

```
jul_a<- pnorm(25,31.5,4.2)
jul_b<- pnorm(37,31.5,4.2)
pr_jul<-jul_b-jul_a # 0.84396 - probability for the month of July to be within 25 to 37 degrees

jan_a<- pnorm(25,22.4,3.2)
jan_b<- pnorm(37,22.4,3.2)
pr_jan<-jan_b-jan_a # 0.2082 - probability for the month of January to be within 25 to 37 degrees

run_jul<-1-pnorm(25,31.5,4.2) # 0.93 - if greater than 0.2 he will not run

run_jan<-1-pnorm(25,22.4,3.2) # 0.208 - if greater than 0.2 he will not run

# he will not run on the beach in both months.
```

2(i)

```
library(cubature)
f <- function(x)
{
  x[1]*x[1]+x[2]*x[2]
}
one_by_k=(adaptIntegrate(f,c(0,0),c(2,2)))
# k=3/32
```

2(iii)

```
library(cubature)
f <- function(x)
{
  (3/32)*(x[1]*x[1]+x[2]*x[2])
}
Pr=(adaptIntegrate(f,c(0.4,0.2),c(0.8,0.4))) # 0.0035
```

3a)

```
library(plot3D)
y=seq(0,1,0.01)
x=seq(0,2,0.02)

cdf_y=(3*y*y+4*y)/9
cdf_x=(3*x*x+2*x)/36

pdf= function(x,y){
  (x+y)/3
}
plot(y,cdf_y,type="l",xlab="y",ylab="cdf of y",main="cdf of y")

plot(x,cdf_x,type="l",xlab="x",ylab="cdf of x",main="cdf of x")

z=outer(x, y ,pdf)
persp(x,y,z,theta=30,phi=30,ticktype="detailed")
```