Point Pattern Exam Question 1

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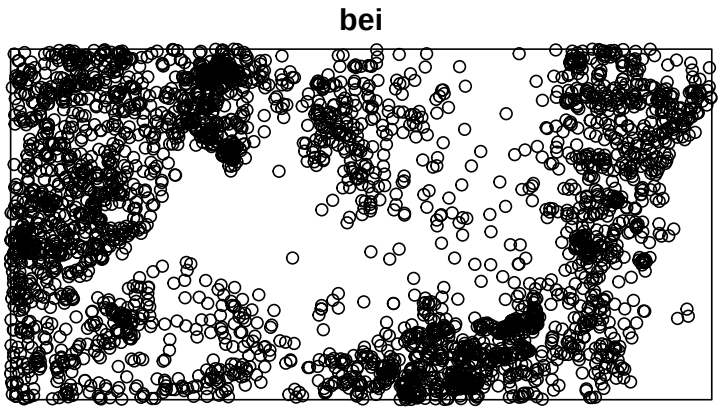
```
library(spatstat)
```

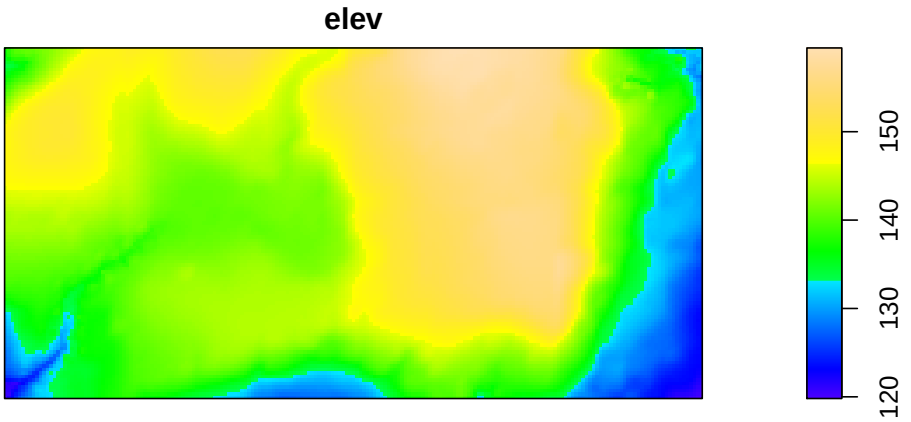
```
## Warning: package 'spatstat' was built under R version 3.0.3
```

```
##
## spatstat 1.38-1       (nickname: 'Le Hardi')
## For an introduction to spatstat, type 'beginner'
```

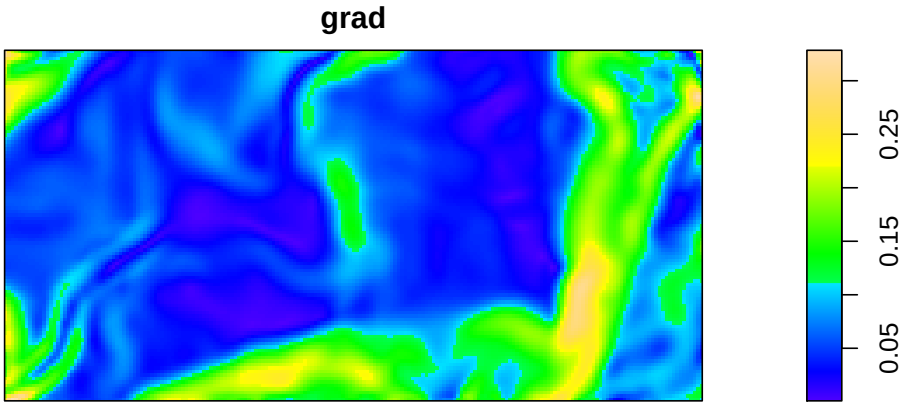
```
data(bei)

plot(bei)
```



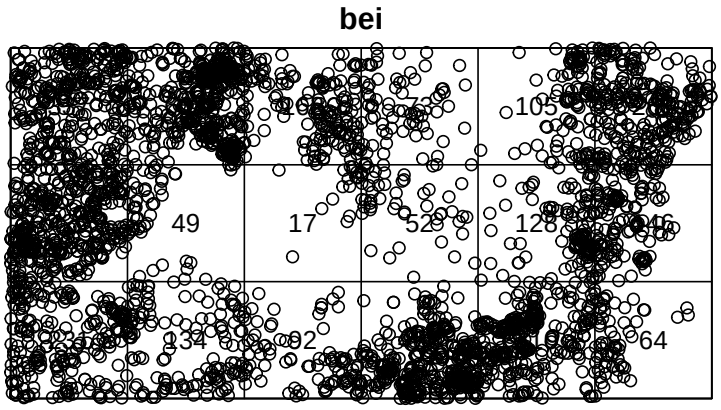

```
elev <- bei.extra$elev
grad <- bei.extra$grad
plot(elev)
```



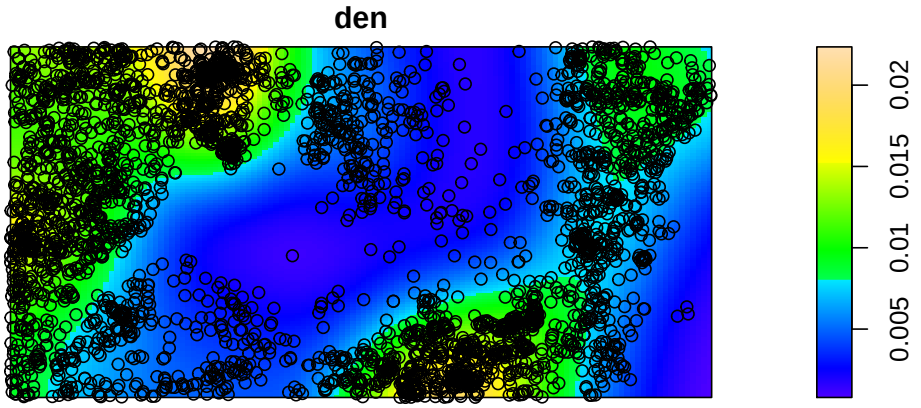

```
plot(grad)
```



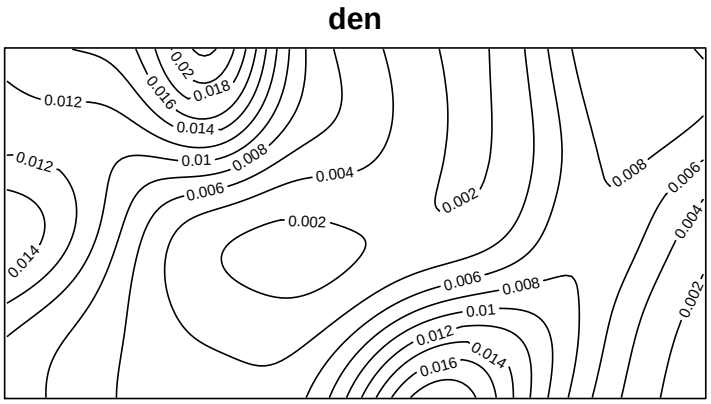

```
q <- quadratcount(bei, nx=6,ny=3)
plot(bei)
plot(q, add=T)
```



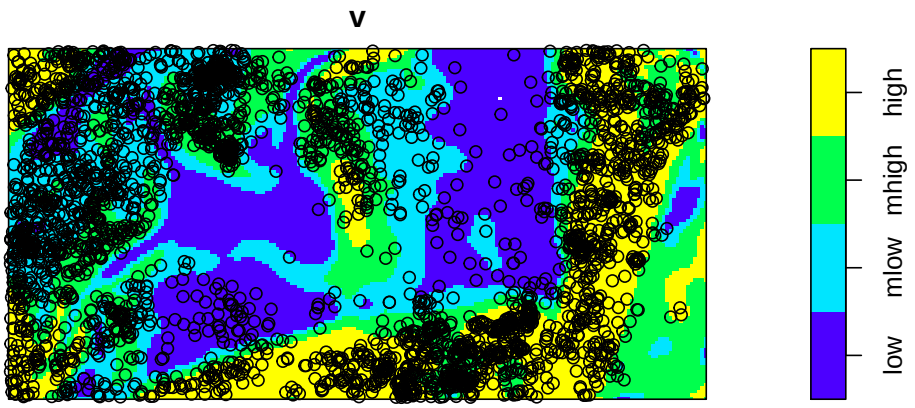

```
den <- density.ppp(bei, sigma=70, kernel="gaussian")
plot(den)
plot(bei,add=T)
```



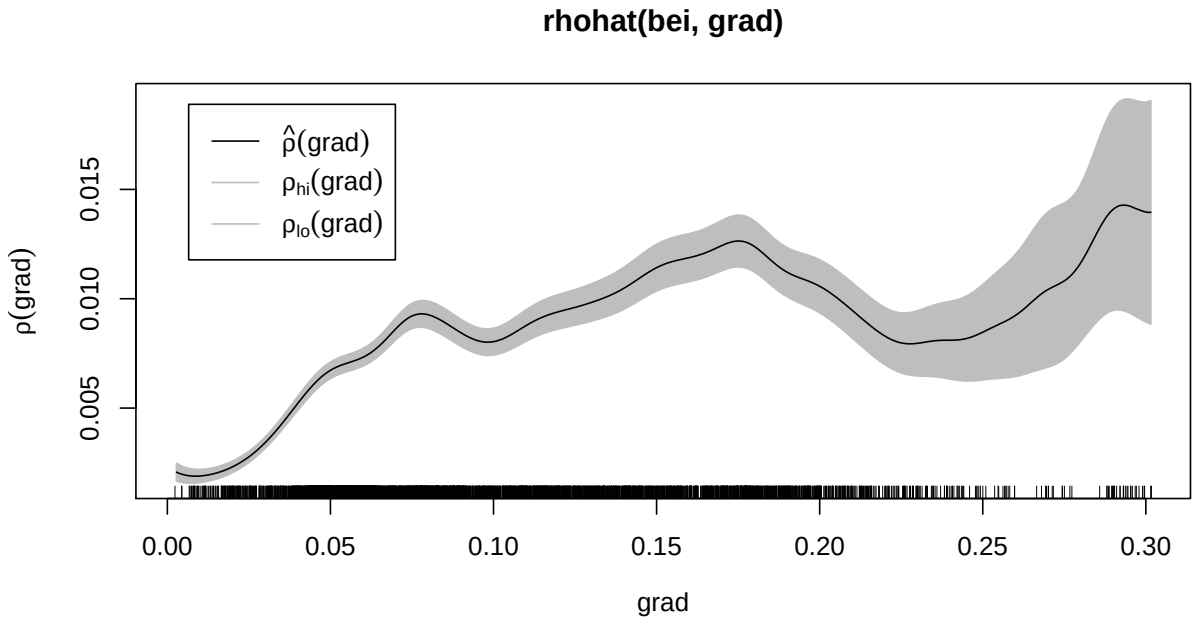

```
contour(den)
```



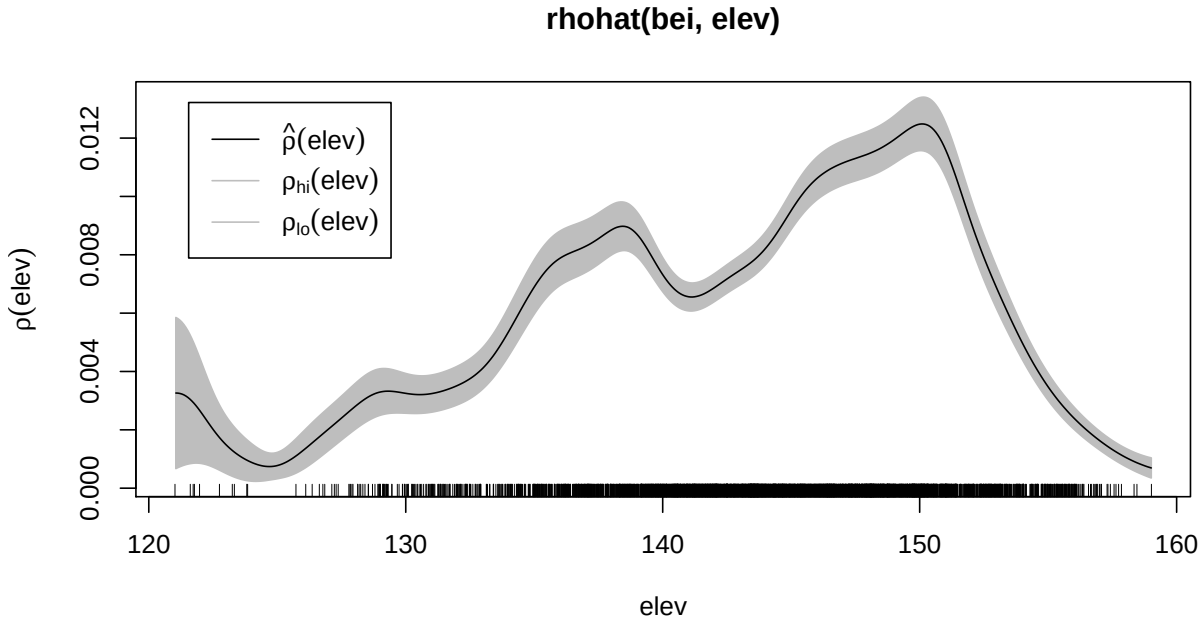

```
b <- quantile(grad, probs=(0:4)/4)
gradcut <- cut(grad, breaks=b, labels=c('low','mlow','mhigh','high'))
v <- tess(image=gradcut)
plot(v)
plot(bei, add=T)
```



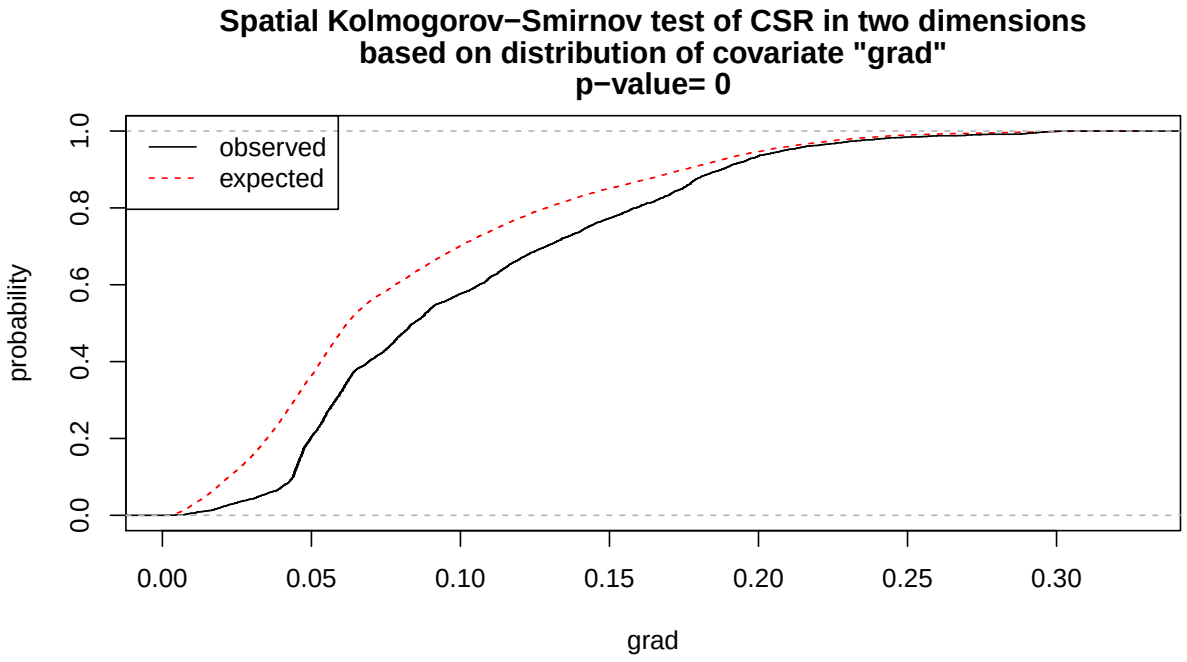
```
qb <- quadratcount(bei, tess=v)
plot(rhohat(bei,grad))
```



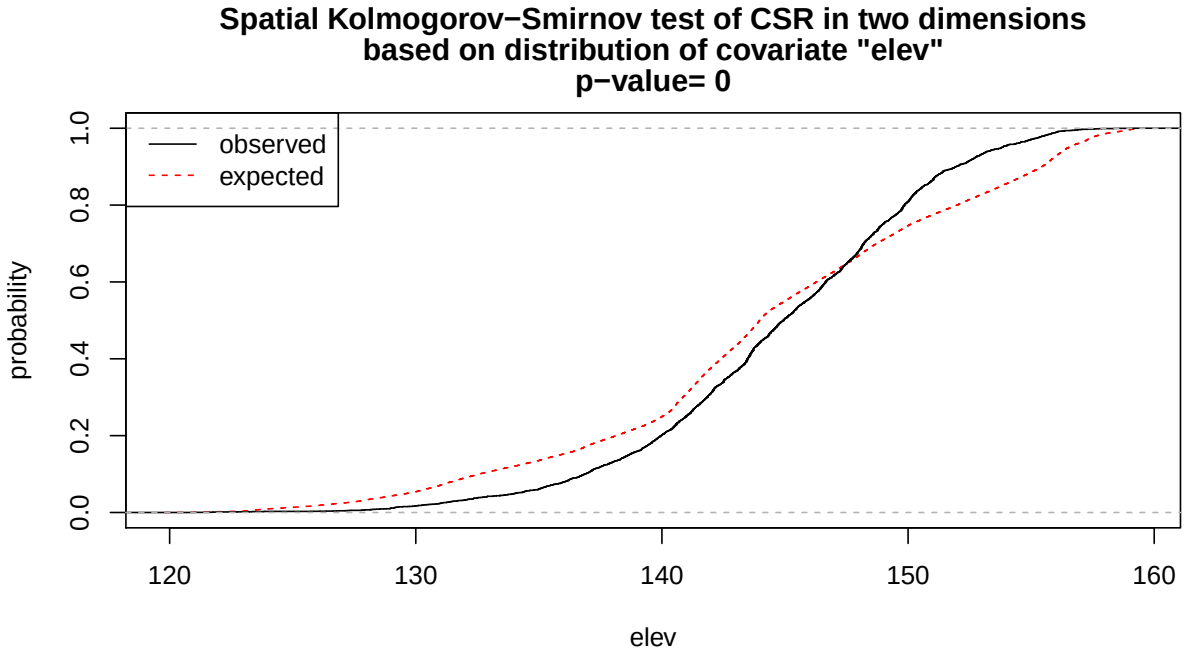

```
plot(rhohat(bei,elev))
```



```
plot(cdf.test(bei,grad,test="ks"))
```




```
plot(cdf.test(bei,elev,test="ks"))
```




```
null <- ppm(bei)
grd <- ppm(bei ~ grad)
```

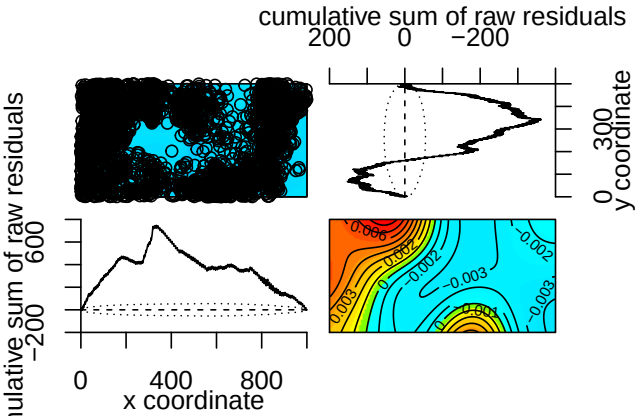
```
elv <- ppm(bei ~ elev)
grd.elv <- ppm(bei ~ elev * grad)
grd_elv <- ppm(bei ~ elev + grad)

aic <- matrix(ncol=2, nrow=5)
aic[,1] <- c("null","grd","elv","grd.elv","grd_elv")
aic[,2] <- c(AIC(null),AIC(grd),AIC(elv),AIC(grd.elv),AIC(grd_elv))

aic
```

```
##      [,1]       [,2]
## [1,] "null"     "42763.9195725373"
## [2,] "grd"      "42383.6647762241"
## [3,] "elv"      "42760.5117434741"
## [4,] "grd.elv"  "42230.0652927119"
## [5,] "grd_elv"  "42296.2095896515"
```

```
aic[aic[,2]==min(aic[,2]),]
```

```
## [1] "grd.elv"          "42230.0652927119"
```

```
diagnose.ppm(grd.elv)
```




```
## Model diagnostics (raw residuals)
## Diagnostics available:
##  four-panel plot
##  mark plot
##  smoothed residual field
##  x cumulative residuals
```

```
##  y cumulative residuals
##  sum of all residuals
## sum of raw residuals in entire window = -6.467e-09
## area of entire window = 5e+05
## quadrature area = 5e+05
## range of smoothed field = [ -0.004274,0.008633 ]
```

```
pred <- predict(grd.elv, se=T)
```

```
## Warning: In predict.ppm: unrecognised argument 'se' was ignored
```