individual assignment 12

student id: 474084 Yiqing Zhang

(a)

```
library(ISLR)
attach(USArrests)

pr.out=prcomp(USArrests,scale=TRUE)
pr.var=pr.out$sdev^2
pve=pr.var/sum(pr.var)
pve
```

```
## [1] 0.62006039 0.24744129 0.08914080 0.04335752
```

In this chuck, I use prcomp function to get the output and calculate PVE.

```
rotation=pr.out$rotation
USArrests_new=as.matrix(scale(USArrests))
sumvar=sum(apply(USArrests_new^2,2,sum))
apply((USArrests_new %*% rotation)^2,2,sum)/sumvar
```

```
##        PC1        PC2        PC3        PC4
## 0.62006039 0.24744129 0.08914080 0.04335752
```

In this chuck, I apply Equation 10.8 directly to get PVE, which has the same results with the previous method in question a.