

[Homework #4]

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```
library (EnvStats)
```

```
##  
## Attaching package: 'EnvStats'
```

```
## The following objects are masked from 'package:stats':  
##  
##   predict, predict.lm
```

```
## The following object is masked from 'package:base':  
##  
##   print.default
```

Exercise 1:

```
#Written in other PDF
```

Exercise 2:

```
alpha=.05  
Democrats=c(22.4,24.0,38.0,45.7,21.2,17.9,38.2,33.7,23.8)  
Republicans=c(45.7,28.6,14.2,18.8,50.3,40.1,52.4)  
n=length(Democrats)  
m=length(Republicans)  
mu1=mean(Democrats)  
mu2=mean(Republicans)  
S2X=var(Democrats)  
S2Y=var(Republicans)  
t=(mu1-mu2)/(sqrt((S2X/n)+(S2Y/m)))  
theta=S2X/S2Y  
v=(theta+(n/m))^2/(theta^2/(n-1)+((1/(m-1))*(n/m)^2))  
v
```

```
## [1] 9.584532
```

```
#Rounded 9.584532 to 10  
2*pt(-abs(t),10)
```

```
## [1] 0.3644737
```

```
#As the p values is above .05 we fail to reject the null hypothesis.
```

Exercise 3:

```
#Written in other PDF
```

Exercise 4:

```
x=c(2.21,2.47,2.81,2.81,2.96,3.00,3.35,3.44,3.44,3.49)
mu=1.84
sigma0=(0.262)^2
n=10
m=10
s2x=var(x)
#a
alpha=.05
l=qchisq(alpha/2,n-1)
r=qchisq(1-alpha/2,n-1)
lower=sqrt((n-1)*s2x/r)
upper=sqrt((n-1)*s2x/l)
c(lower,upper)
```

```
## [1] 0.3014431 0.8000719
```

```
#0.3014431 0.8000719

#b
x=((m-1)^2*s2x/sigma0^2)
1-pchisq(x,m-1)
```

```
## [1] 0
```

We reject the null hypothesis because the p-value < .05. At the level of significant $\alpha=1\%$, the data suggest that the interest rates for five-year CDs are more variable than those for one-year certificates

Exercise 5:

```
x=c(2.21,2.47,2.81,2.81,2.96,3.00,3.35,3.44,3.44,3.49)
varTest(x,alternative="two.sided",conf.level=.95,sigma.squared=(.262)^4)
```

```
##
## Chi-Squared Test on Variance
##
## data: x
## Chi-Squared = 366.84, df = 9, p-value < 2.2e-16
## alternative hypothesis: true variance is not equal to 0.004711999
## 95 percent confidence interval:
## 0.09086795 0.64011506
## sample estimates:
## variance
## 0.1920622
```

```
sqrt( c(0.09086795,0.64011506))
```

```
## [1] 0.3014431 0.8000719
```