STAT 455 Homework 01 - R Code

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Problem 1.7

```
y <- 20
n <- 20
pi.0 <- 0.5
pi.hat <- y/n
z.a <- abs(qnorm(0.025, 0, 1))
```

Problem 1.7d

```
S.2 <- (n*(pi.hat - pi.0)^2) / (pi.0*(1-pi.0))
S <- sqrt(S.2)
pi.tilde <- pi.hat*(n / (n + z.a^2))+ 0.5*( z.a^2 / (n + z.a^2))
c <- z.a*sqrt(
  (1 / ( n + z.a^2))*
    (pi.hat*(1 - pi.hat)* (n / (n + z.a^2)) + .5*.5*(z.a^2 / (n + z.a^2))
     )
  )
apval <- 1- pchisq(20 , 1)
S.2.lower <- pi.tilde - c
S.2.upper <- pi.tilde + c
```

```
## [1] "S^2: 20"
```

```
## [1] "S: 4.47213595499958"
```

```
## [1] "Appox pval:  7.74421643101597e-06"
```

```
## [1] "Confidence Interval: [ 0.838874841947181 ,  1 ]"
```

Problem 1.7e

```
L.2 <- 2*( y*log(y/(n*pi.0))) #(n - y)*log( (n - y)/ (n - n*pi.0))
L <- sqrt(L.2)
L.2.lower <- exp(-(z.a^2)/40)
L.2.upper <- 1
```

```
## [1] "L^2: 27.7258872223978"
```

```
## [1] "L: 5.26553769546832"
```

```
## [1] "Confidence Interval: [ 0.908430884520209 ,  1 ]"
```

Problem 1.7f

```
diff <- 0.05
pi.T <- 0.9
n <- (z.a^2 * pi.T * (1 - pi.T)) / (diff^2)
```

```
## [1] "n =  138.292517544988 so a sample size of  138  is needed"
```