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title: "MATH 324 Computer HW 4"
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date: "05/12/2020"
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Exercise #1

mu=8
xbars=6.8
sd=1.9
a=0.10
n=18
1) The Null Hypothesis is mu= 8.
2)The alternate hypothesis or H_a = mu<8
3) We use the T- Test for this problem
4)The test statistic = -2.6796
R Code:

```
> Test_Statistic=(xbars-mu)/(sd/sqrt(n))
> Test_Statistic
[1] -2.679563
```

5) The P value is -1.333379
R Code:

```
> qt(a,n-1)
[1] -1.333379
```

6) We reject the null hypothesis because the p value is small so it's rejected.

Exercise #2

R Code = prop.test(747,1168,conf.level=0.98)

Results =

1-sample proportions test with continuity correction

data: 747 out of 1168, null probability 0.5
X-squared = 90.432, df = 1, p-value < 2.2e-16
alternative hypothesis: true p is not equal to 0.5
98 percent confidence interval:

0.6058635 0.6719420
sample estimates:
p
0.6395548

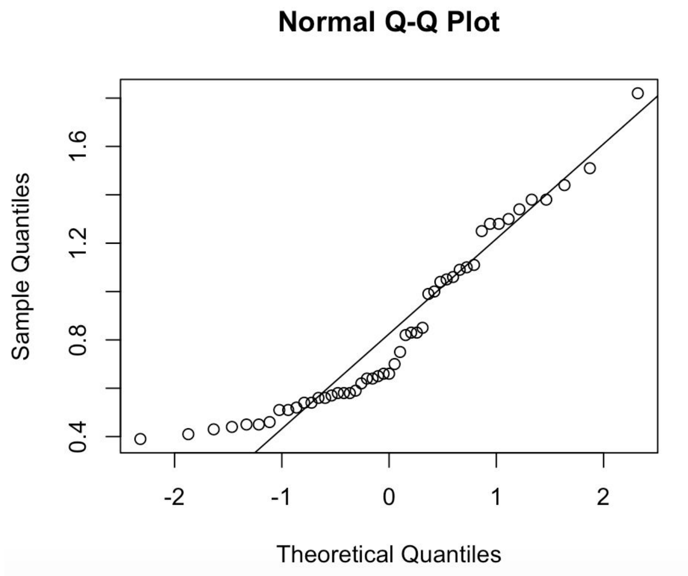
also we could do

R:code
```
> a=747
> b=1168
> c=a/b
> SE = sqrt(c∗(1−c)/b)
>[1]0.01404
>E = qnorm(.99)∗SE; E
>[1]0.03268
c+c(-E,E)
[1]0.6069 0.6722
```

Exercise #3

```
x=c(1.38,0.44,1.09,0.75,0.66,1.28,0.51,0.39,0.70,0.46,0.54,0.83,0.58,0.64,1.30,0.57,0.43,0.62,1
.00,1.05,1.82,1.10,0.65,0.99,0.56,0.56,0.64,0.45,0.82,1.06,0.41,0.58,0.66,0.54,0.83,0.59,1.51,1.
04,0.85,0.45,0.52,0.58,1.11,1.34,1.25,1.38,1.44,1.28,0.51)
```

1) R Code:
```
> mean(x)
[1] 0.7538
> sd(x)
0.3044
```
2) Whenever we want to check or understand normality we use a normal probability plot.



3) The data doesn't look like it's coming from the normal distribution due to the fact that its so scattered.

4a) The null hypothesis is mu = 1
b) The alternative hypothesis would be
c) Z_a = Z_0.05 = -1.645
d) used the same R code as above problems. P- Value = 0.00001

6.
R Code:

```
> a=0.7498
> b=1.645
> c=0.3025
> d=49
> a + b * (0.3025/sqrt(49))
[1] 0.8208875
```

7. Since my p value is very small being less than 0.05 we reject the null hypothesis.

Exercise #4

1) the null hypothesis would be p=0.4
2) The alternative hypothesis would be p does not equal 0.4
3) In this problem and R code we use the z-test
4)
R Code:

```
z.test<-function(x,n,p=NULL,conf.level=0.95,alternative="less"){}
teststat<-NULL
cinterval<-NULL
p.value<-NULL

if(length(p)>0){
r=1-p
SE.ph=sqrt((p*r)/n)
teststat<-(ph-p)/SE.ph
p.value<-pnorm(teststat)

   if(alternative=="two.sided"){
   p.value<-(1-p.value)*2
   }
}
else{
SE.ph<-sqrt((ph*qh)/n)
}
z.test(83,160,p-0.4,alternative="two.sided)

>estimate
[1] 0.51875
>p.value
[1]3.066
```

6) We reject the null hypothesis because of our significance level of 0.1

7) My conclusion would be different if the significance level would be 0.5 because it would be really similar to 0.1, it needs to be more significant than that.

Exercise #5

1) The null hypothesis would be mu = 9.75
2) The alternative hypothesis would be mu >9.75
3) Yes the data came from a normal distribution

R Code:

```
> library("normality plot")
>
ft=c(9.85,9.73,9.75,9.77,9.67,9.87,9.67,9.94,9.85,9.75,9.83,9.92,9.74,9.99,9.88,9.95,9.95,9.93,9
.92,9.89)
> ad.test(ft)
        Anderson-Darling normality test
```

data: ft
A = 0.4485 , p-value = 0.2499
4) We use the t-test in order to find the next answers.
5) For the test statistic we get 4.3301 and for the p value we get 0.00018
R Code:

```
> t.test(ft,mu = 9.75, alternative = "greater")

	One Sample t-test

data:  ft
t = 4.3301, df = 19, p-value = 0.0001804
alternative hypothesis: true mean is greater than 9.75
95 percent confidence interval:
 9.806463      Inf
sample estimates:
mean of x
   9.8442
```

6) Conclusion: we reject the null hypothesis because our p-value is smaller than our alpha, 0.05.