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Stat318 HW4

2/8/19

1)

b) Calculation of t:

```
> qt(1-.10/2, 7)
[1] 1.894579
```

2)

a) Calculation of p:

```
> 1-pt(2.911,9)
[1] 0.008641548
```

b) Calculation of p:

```
> 1-psignrank(40.5,9)
[1] 0.009765625
```

3)

a) Calculation of p:

```
> 2*pwilcox(32.5,11,10)
[1] 0.114466
```

b) Calculation of p:

```
> 2*(1-pt(1.191, 14.61))
[1] 0.2526443
```

4)

Calculation of t:

```
> qt(1-.05/2, 30.0474)
[1] 2.042137
```

5)

a)

Ho: µ before = µ after

Ha: µ before < µ after

T value= -4.113

p-value= .0007192

Interpretation: If the null hypothesis, that the mean pulse rate before the scare is equal to the mean pulse rate after the scare is true, we would expect to see data like ours, or more extreme, .07192% of the time.

Conclusion (p<.01): There is very strong evidence in favor of the alternative hypothesis that the mean pulse rate after the scare is greater than the mean pulse rate before the scare.

```
> pulsebefore.data= c(64,100,80,60,92,80,68,84,80,68,60,68,68)
> pulseafter.data= c(68,112,84,68,104,92,72,88,80,92,76,72,100)
> t.test(pulsebefore.data,pulseafter.data, paired = T, alternative = "less")

        Paired t-test

data:  pulsebefore.data and pulseafter.data
t = -4.113, df = 12, p-value = 0.0007192
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
      -Inf -5.928278
sample estimates:
mean of the differences
              -10.46154
```

b)

Ho: Ø before= Ø after

Ha: Ø before< Ø after

V= 0

p= .0002441

Interpretation: If the null hypothesis, that the median pulse rate before the scare is equal to the median pulse rate after the scare, is true, we would expect to see data like ours, or more extreme, .02441% of the time.

Conclusion (p<.01): There is very strong evidence in support of the alternative hypothesis that the median pulse rate after the scare is greater than the median pulse rate before the scare.

```
> library(exactRankTests)
```

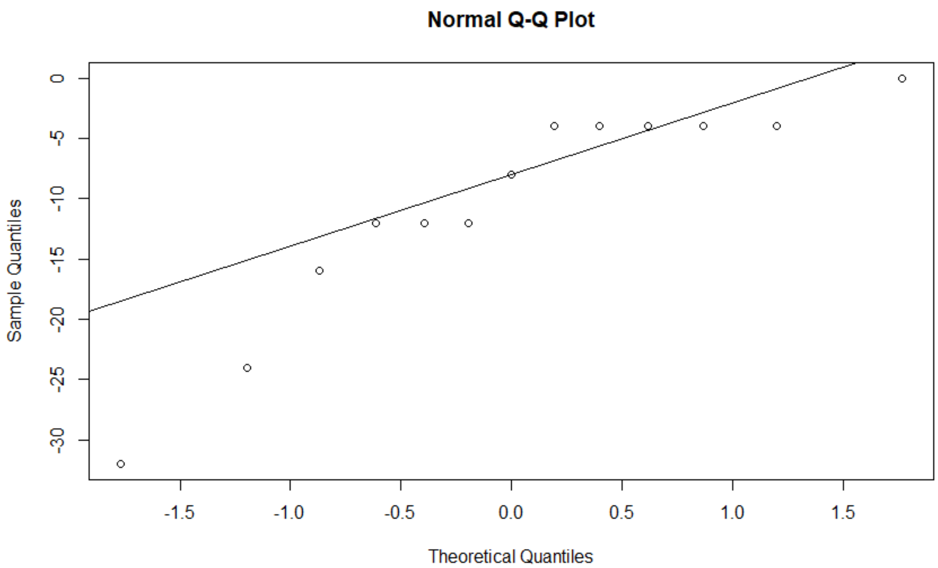
```
> wilcox.exact(pulsebefore.data,pulseafter.data, paired=T, alternative= "less
")

        Exact Wilcoxon signed rank test

data:  pulsebefore.data and pulseafter.data
V = 0, p-value = 0.0002441
alternative hypothesis: true mu is less than 0
```

c)

```
> qqnorm(pulsebefore.data - pulseafter.data)
> qqline(pulsebefore.data - pulseafter.data)
```



The most appropriate method would be non-parametric. With a sample size of 13 and not fitting the line well, t procedures would not be appropriate.

6)

a)

```
> reacttime.data= read.delim("clipboard", header=T)
> attach(reacttime.data)
> t.test(wocell,withcell, paired = T, conf.level=.95)
```

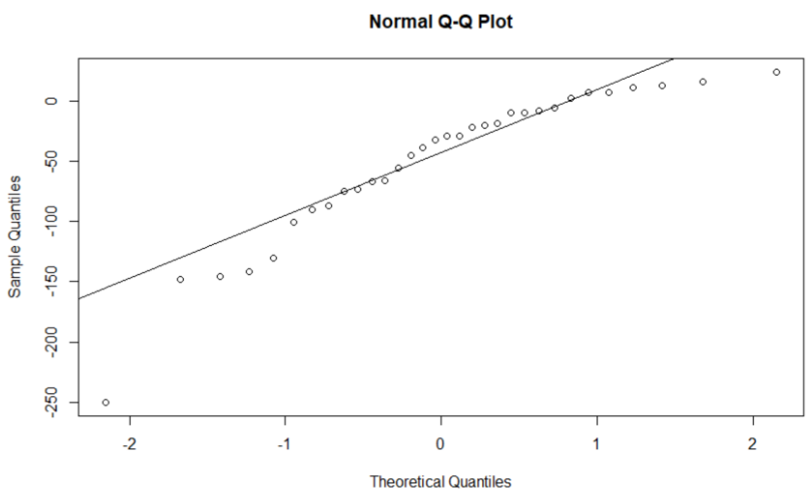
```
        Paired t-test

data:  wocell and withcell
t = -4.63, df = 31, p-value = 6.185e-05
alternative hypothesis: true difference in means is not equal to 0
95 percent confidence interval:
 -72.92519 -28.32481
sample estimates:
mean of the differences
                -50.625
```

Interpretation: We are 95% confident the true mean difference in reaction times without a cell and with a cell are between -72.92519 and -28.32481.

(the all negative confidence interval tells us that the reaction times with a cellphone were greater (slower) than without a cellphone)

b)



The t procedure is appropriate. Although there are a couple outliers, the sample size of 32 allows a judgement call, and the rest of the data fits the line well.

7)

a)

Ho: µ nopool = µ pool

Ha: µ nopool < µ pool

Interpretation: If the null hypothesis, that the mean size of homes without a pool and with a pool are equal, we would expect to see data like ours, or more extreme, .2121% of the time.

Conclusion (p<.01): There is very strong evidence in favor of the alternative hypothesis that the average size of homes without a pool is less than the average size of homes with a pool.

```
> poolhome.data= read.delim("clipboard", header= T)
> t.test(nopool, pool, alternative= "less")

        Welch Two Sample t-test

data:  nopool and pool
t = -3.0518, df = 36.245, p-value = 0.002121
alternative hypothesis: true difference in means is less than 0
95 percent confidence interval:
     -Inf -304.593
sample estimates:
mean of x mean of y
   2087.3    2768.9
```

b)

Ho: Ø nopool = Ø pool

Ha: Ø no pool < Ø pool

Interpretation: If the null hypothesis, that the true median home size without a pool is the same as with a pool, we would expect to see data like ours, or more extreme, .2809% of the time.

Conclusion(p<.01): There is very strong evidence in favor of the alternative hypothesis that the true median home size without a pool is less than with a pool.

```
> wilcox.exact(nopool,pool,alternative = "less")

        Exact Wilcoxon rank sum test

data:  nopool and pool
W = 99, p-value = 0.002809
alternative hypothesis: true mu is less than 0
```