Project 3.2

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9.56

a. A 99% confidence interval for the proportion of African males who have this disorder is (0.1473, 0.3651)

```
library(binom)
binom.confint(24, 100, 0.99, methods = "ac")
```

```
##            method  x   n mean     lower     upper
## 1 agresti-coull 24 100 0.24 0.1472913 0.3650635
```

b. The error is less than or equal to 0.1100

```
p = 0.24
q = 1-p
n = 100
z = qnorm(0.995)
eB = z*sqrt((p*q)/n)
eB
```

```
## [1] 0.1100093
```

9.72

A 98% confidence interval for the variance is (8.3999, 39.8285).

If many samples are collected independently and each is used to compute a confidence interval, then approximately 98% of these confidence intervals will contain the population variance. Any value between 8.3999 and 39.8285 is a plausible value for the true population variance.

```
n = 20
x = 72
s2 = 16

low = ((n-1)*s2)/qchisq(0.99,19)
high = ((n-1)*s2)/qchisq(0.01,19)

low
```

```
## [1] 8.399909
```

```
high
```

```
## [1] 39.82848
```

10.56

H0: p = 0.4 HA: p > 0.4

The p-value obtained using the Agresti-Coull method is 0.1503115, which is greater than the significance level of 0.05. Fail to reject the null hypothesis. We cannot conclude that the proportion of adults favoring the death penalty has increased.

```
n = 15
p = 8/15

TS = (p-0.4)/sqrt((p*(1-p))/n)

p_value = 1- pnorm(TS)
p_value
```

```
## [1] 0.1503115
```

10.69

H0: s^2 = 4.2 HA: s^2 != 4.2

The p-value obtained is 0.8998, which is greater than the significance level of 0.05 Fail to reject the null hypothesis We cannot conclude that the variance of aflotoxins is different from 4.2ppm.

```
n = 64
x = 24.17
s2 = 4.25

TS = ((n-1)*s2)/4.2

p_value = 2 * (1 - pchisq(TS, 63))
p_value
```

```
## [1] 0.8997877
```

16.2

H0: u = 12 HA: u != 12

Using the function eqnpar, the two-sided confidence interval is (11,14). Since 12 is included in this interval, we fail to reject the null. There is not sufficient evidence to conclude that the median training time is different than

12 hours.

```
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
```

```
eqnpar(Ex16.02$hour[-3],p=0.5,type=6,ci=T,ci.method="exact", ci.type="two-sided", app
rox.conf.level = 0.98)
```

```
## $distribution
## [1] "None"
##
## $sample.size
## [1] 17
##
## $method
## [1] "Nonparametric"
##
## $quantiles
## Median
##     12
##
## $quantile.method
## [1] "Nonparametric"
##
## $data.name
## [1] "Ex16.02$hour[-3]"
##
## $bad.obs
## [1] 0
##
## $interval
## $name
## [1] "Confidence"
##
## $parameter
## [1] "50'th %ile"
##
## $limit.ranks
## lcl.rank ucl.rank
##        4       14
##
## $limits
## LCL UCL
##  11  14
##
## $type
## [1] "two-sided"
##
## $method
## [1] "exact"
##
## $conf.level
## [1] 0.9872742
##
## $sample.size
## [1] 17
##
## attr(,"class")
## [1] "intervalEstimate"
```

```
##
## attr(,"class")
## [1] "estimate"
```

16.9

H0: u = 12 HA: u != 12

Using the function wilcox.test, the p-value is approximately 0.3439, which is greater than the significance level. The confidence interval is (11, 14) and includes the null value of 12, so we fail to reject the null hypothesis. Do not reject H0. There is not sufficient evidence to conclude that the median training time is different than 12 hours.

```
wilcox.test(Ex16.02$hour, mu = 12, alternative = "two.sided", conf.int = TRUE)
```

```
## Warning in wilcox.test.default(Ex16.02$hour, mu = 12, alternative =
## "two.sided", : cannot compute exact p-value with ties
```

```
## Warning in wilcox.test.default(Ex16.02$hour, mu = 12, alternative =
## "two.sided", : cannot compute exact confidence interval with ties
```

```
## Warning in wilcox.test.default(Ex16.02$hour, mu = 12, alternative =
## "two.sided", : cannot compute exact p-value with zeroes
```

```
## Warning in wilcox.test.default(Ex16.02$hour, mu = 12, alternative =
## "two.sided", : cannot compute exact confidence interval with zeroes
```

```
##
##  Wilcoxon signed rank test with continuity correction
##
## data:  Ex16.02$hour
## V = 77, p-value = 0.3439
## alternative hypothesis: true location is not equal to 12
## 95 percent confidence interval:
##  11.00003 14.00002
## sample estimates:
## (pseudo)median
##       12.50005
```