Zach Ritter

MATH 325 Exam 2

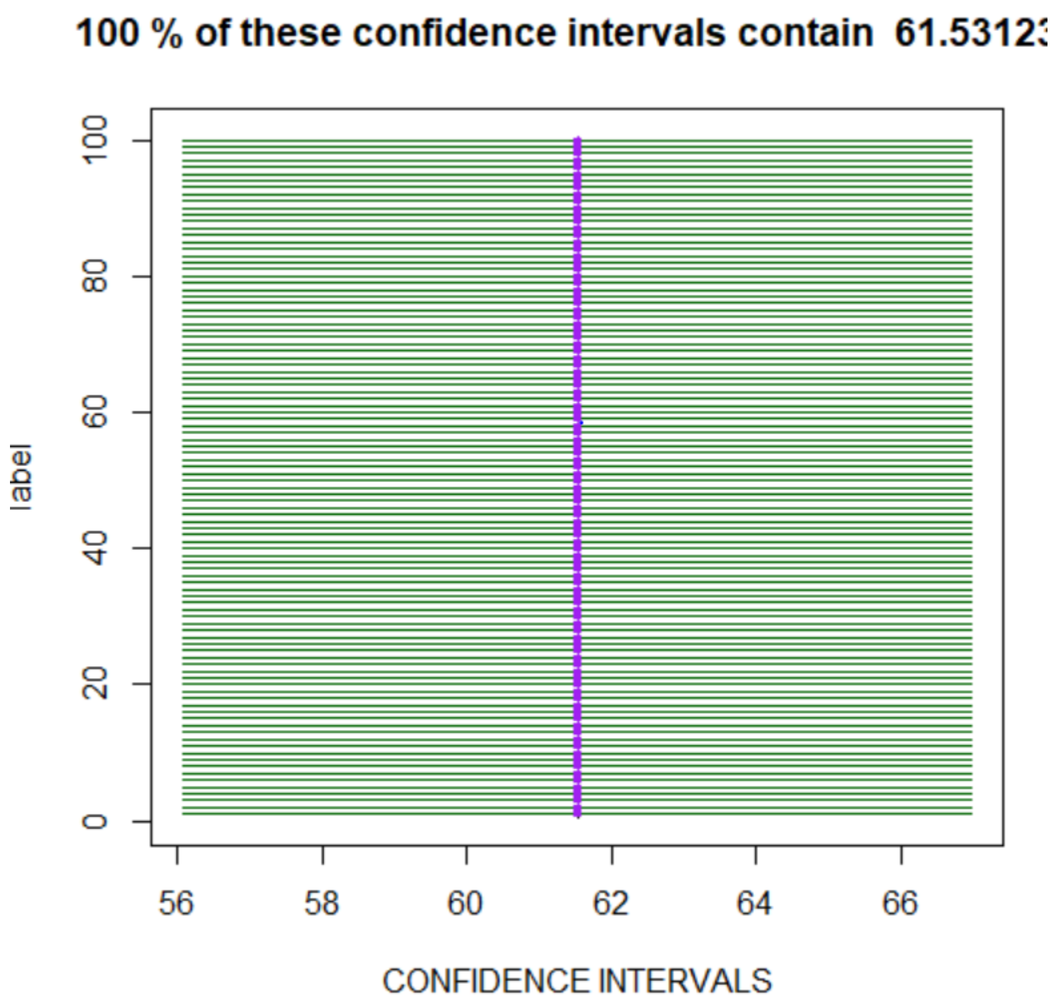
1. a

Source:

```
> x2 = rnorm( 9, 60, 7 )
> g = replicate(100, CI.t.test(x2))
> g[1:10]
 [1] 56.07445 66.98801 56.07445 66.98801 56.07445 66.98801 56.07445 66.98801
 [9] 56.07445 66.98801
> mu = mean(x2)
```

b.

```
> plotCI(g,mu=mu)
```



c. 100 percent of the intervals contain the population mean

2. a

Source: > y = read.table2("EXER4_41.txt")

```
> y
Output:    V1  V2 V3
1   1 278  Y
2   2 192  Y
3   3 310  Y
4   4  94  N
5   5  86  Y
6   6 335  Y
7   7 310  N
8   8 290  Y
9   9 221  Y
10 10 168  Y
11 11 188  N
12 12 212  N
13 13  92  Y
14 14  56  Y
15 15 142  Y
16 16  37  Y
17 17 186  N
18 18 221  Y
19 19 219  N
20 20 305  Y
```

b.

Source:

```
> f = c(y[,2])
> N = 362
> mean(f) * N
Output: [1] 71350.2
```

c.

```
> fpc0 = (1-n/N)
> b = 2* N * sd(f) * sqrt(1/n * fpc0)
> b
Output: [1] 14296.9
```

d.

```
> mydesign = svydesign(~1, fpc = rep(N,n), data = g)
> h = svytotal(~f,mydesign)
  total    SE
f 71350 7148.5
> b2 = SE(h) * 2
> b2
       f
Output : f 14296.9
```

e.

Source:

```
> d = (4800^2)/(4*362^2)
> s2 = sum((f-mu)^2)*(1/19)
> N*s2/(N-1)*d + s2
```

Output : [1] 372108.1

3a.

(-6,-4)

(-6,3)

(-6,9)

(-4,3)

(-4,9)

(3,9)

b.

```
> var (c(-6,-4))
[1] 2
> var (c(-6,3))
[1] 40.5
> var (c(-6,9))
[1] 112.5
> var (c(-4,3))
[1] 24.5
> var (c(-4,9))
[1] 84.5
> var (c(3,9))
[1] 18
```

c.

```
>(2*1/6) + (40.5*1/6) + (112.5 * 1/6) + (24.5*1/6) + (84.5*1/6)+(18*1/6)
47
```

d.

```
> ((y1^2*1/6) + (y2^2*1/6)+(y3^2*1/6)+(y4^2*1/6)+(y5^2*1/6)+(y6^2*1/6))
[1] 12
> mu = ((y1*1/6) + (y2*1/6)+(y3*1/6)+(y4*1/6)+(y5*1/6)+(y6*1/6))
> 12 - mu^2
[1] 11.75
```

e. The value in part c should be greater than the true population variance because our population size is so low, this creates for a greater fpc and ultimately results in a very high variance between the values. If, N was huge compared to n, we wouldn't have to worry about the variance as much, as it would most likely be close to the population variance.

4.

D

5.

E