Practice 7 Confidence intervals

Answers in R

4.

```
> alpha=1-0.91
> qnorm(1-alpha/2)
[1] 1.695398
```

5.

```
> alpha=1-0.95
> qnorm(1-alpha/2)
[1] 1.959964
```

6.

```
> #for a CI, (left or lower bound, right or upper bound): phat=(Right+Left)/2
; Error=(Right-Left)/2
> phat=(0.507+0.047)/2;Error=(0.507-0.047)/2
> phat; Error
[1] 0.277
[1] 0.23
```

7.

```
> install.packages("epitools")
> library(epitools) # require(epitools) is also valid.
> binom.approx(x=60,n=320, conf.level = .95)
   x   n proportion     lower     upper conf.level
1 60 320     0.1875 0.1447353 0.2302647       0.95

> Error1=(0.2302647-0.1447353 )/2 # Error=(Right-Left)/2
> Error1
[1] 0.0427647
```

8.

```
> x=0.40 * 1580
> x
[1] 632
> binom.approx(632,1580, conf.level = .90) # x and n labels omitted.
    x    n proportion     lower     upper conf.level
1 632 1580        0.4 0.3797276 0.4202724        0.9


> Error2=(0.4202724-0.1447353 )/2 # Error=(Right-Left)/2
> Error2
[1] 0.1377685
```

9.

```
> binom.approx(x=72,n=125, conf.level = .90)
   x   n proportion     lower     upper conf.level
1 72 125      0.576 0.5032946 0.6487054        0.9
```

10.

```
> binom.approx(x=122,n=164, conf.level = .95)
    x   n proportion     lower    upper conf.level
1 122 164  0.7439024 0.6771008 0.810704       0.95
```

11.

```
> #using formula:
> n=(1.96^2*0.5*0.5)/0.004^2
> n
[1] 60025
```

Using function: (see lab 6)

```
> n.sample.prop<-function(conf.level,phat,error){
+     n=(qnorm((1-conf.level)/2))^2*phat*(1-phat)/error^2
+     return(ceiling(n))
+     }
> n.sample.prop(.95,0.5,0.004)
[1] 60023

>#  notice that the final differs; by using the function, R takes as critical
value 1.959964 instead of 1.96:
> (1.959964^2*0.5*0.5)/0.004^2
[1] 60022.8
```

12.

```
> n.sample.prop(.95,0.52,0.01)
[1] 9589
```

13.

```
> binom.approx(x=408,n=865, conf.level = .95)
    x   n proportion     lower     upper conf.level
1 408 865  0.4716763 0.4384094 0.5049432       0.95

> #(0.4384094<p<0.5049432); #(lower<p<0.upper)

> round(0.4384094, digits=3);round(0.5049432, digits=3) # use round function
if you need to.
[1] 0.438
[1] 0.505
```

14.

```
> binom.approx(x=12,n=346, conf.level = .98)
   x   n proportion      lower      upper conf.level
1 12 346 0.03468208 0.01179848 0.05756568       0.98
```

15.

```
> binom.approx(x=112,n=300, conf.level = .98)
    x   n proportion     lower     upper conf.level
1 112 300  0.3733333 0.3083681 0.4382985       0.98
```

16.

```
> binom.approx(x=35,n=101, conf.level = .95)
   x   n proportion     lower     upper conf.level
1 35 101  0.3465347 0.2537295 0.4393398       0.95
> 0.2537295*100;0.4393398*100
[1] 25.37295
[1] 43.93398
```

17.

```
> binom.approx(x=31,n=669, conf.level = .98)
   x   n proportion      lower      upper conf.level
1 31 669 0.04633782 0.02743064 0.06524499       0.98
> 0.02743064*100;0.06524499*100
[1] 2.743064
[1] 6.524499
```

18.

```
> z.conf.int<-function(xbar,sigma,n,cl){
+      se<-qnorm((1-cl)/2)*sigma/sqrt(n)
+     l=xbar+se
+     r=xbar-se
+     ci=c(l,r)
+     return(ci)
+     }

> z.conf.int(90.6,8.9,92,.99)
[1] 88.20992 92.99008
```

19.

```
> n.sample.mean<-function(conf.level,sigma,error){
+     n=qnorm((1-conf.level)/2)*sigma/error
+     return(ceiling(n^2))
+     }
> n.sample.mean(.95,593,120)
[1] 94
```

20.

```
> n.sample.mean(.99,591,137)
[1] 124
```

21.

```
> t.conf.int<-function(xbar,s,n,cl){
+     se<-qt((1-cl)/2, n-1)*s/sqrt(n)
+     l=xbar+se
+     r=xbar-se
+     ci=c(l,r)
+     return(ci)
+     }
>
> t.conf.int(8.7,3.3,10,.95)
[1]  6.339322 11.060678
```

22.

```
> t.conf.int(225,15.7,12,.95)
[1] 215.0247 234.9753
```

23.

```
> t.conf.int(76.2,21.4,27,.95)
[1] 67.73444 84.66556
```

24.

```
> x<-c(76.5,85.2,77.9,83.6,71.9,88.6)
> t.test(x, conf.level = .90)

        One Sample t-test

data:  x
t = 31.706, df = 5, p-value = 5.861e-07
alternative hypothesis: true mean is not equal to 0
90 percent confidence interval:
 75.49315 85.74018
sample estimates:
mean of x
 80.61667
```

25.

```
> y<-c(15.2, 15.5, 15.9, 15.5, 15.0, 15.7, 15.0, 15.7)
> t.test(y, conf.level = .98)

        One Sample t-test

data:  y
t = 129.26, df = 7, p-value = 4.375e-13
alternative hypothesis: true mean is not equal to 0
98 percent confidence interval:
 15.07946 15.79554
sample estimates:
mean of x
  15.4375
```

26.

```
> z<-c(7.2, 10.5, 9.9, 8.2, 11.0, 7.3, 6.7, 11.0, 10.8, 12.4)
> t.test(z, conf.level = .95)

        One Sample t-test

data:  z
t = 15.143, df = 9, p-value = 1.039e-07
alternative hypothesis: true mean is not equal to 0
95 percent confidence interval:
  8.080858 10.919142
sample estimates:
mean of x
      9.5
```