Partial solutions to selected problems from section 5.3

Problem 5.30

\begin{verbatim}
> p<- 722/1183
> z <- qnorm(.995)
> ll<- p-z*sqrt(p*(1-p)/1183)
> ul<- p+z*sqrt(p*(1-p)/1183)
> CI <- c(ll,ul)
> CI
[1] 0.5737904 0.6468351

OR

> prop.test(722,1183,conf.level=.99)

1-sample proportions test with continuity correction
data:  722 out of 1183, null probability 0.5
X-square = 57.1429, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not equal to 0.5
99 percent confidence interval:   0.5728446 0.6465363
sample estimates:
prop'n in Group 1
0.6103128

OR

> prop.test(722,1183,conf.level=.99,correct=F)

1-sample proportions test without continuity correction
data:  722 out of 1183, null probability 0.5
X-square = 57.5833, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not equal to 0.5
99 percent confidence interval:   0.5732719 0.6461231
sample estimates:
prop'n in Group 1
0.6103128
\end{verbatim}
Problem 5.31
> nsize(b=.03,p=722/1183,conf.level=.99,type="pi")

The required sample size \( n \) to estimate the population proportion of successes with a 0.99 confidence interval so that the margin of error is no more than 0.03 is 1754.

Problem 5.32
> prop.test(180,900,conf.level=.90)

```
1-sample proportions test with continuity correction

data:  180 out of 900, null probability 0.5
X-square = 322.8011, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not equal to 0.5
90 percent confidence interval: 0.1784511 0.2233927
sample estimates:
  prop'n in Group 1
      0.2
```

> nsize(b=.03,p=180/900,conf.level=.9,type="pi")

The required sample size \( n \) to estimate the population proportion of successes with a 0.9 confidence interval so that the margin of error is no more than 0.03 is 481.

Problem 5.34
> prop.test(880,1000,conf.level=.90)

```
1-sample proportions test with continuity correction

data:  880 out of 1000, null probability 0.5
X-square = 576.081, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not equal to 0.5
90 percent confidence interval: 0.8615347 0.8963542
sample estimates:
  prop'n in Group 1
      0.88
```
Problem 5.36
> prop.test(1440,2000,conf.level=.98)

        1-sample proportions test with continuity correction

data:  1440 out of 2000, null probability 0.5
X-square = 386.3205, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not
equal to 0.5
98 percent confidence interval:
  0.6958183 0.7429816
sample estimates:
prop'n in Group 1
  0.72

No.

Problem 5.38
> prop.test(708,1200,conf.level=.9)

        1-sample proportions test with continuity correction

data:  708 out of 1200, null probability 0.5
X-square = 38.5208, df = 1, p-value = 0
alternative hypothesis: true P(success) in Group 1 is not
equal to 0.5
90 percent confidence interval:
  0.5660500 0.6135379
sample estimates:
prop'n in Group 1
  0.59

Maximum margin of error is:
> sqrt(.25/1200)*qnorm(.95)
[1] 0.02374142

> nsize(b=.03,p=.5,conf.level=.9,type="pi")

The required sample size (n) to estimate the population
proportion of successes with a 0.9 confidence interval
so that the margin of error is no more than 0.03 is 752.
Problem 5.44

> x<-rbinom(100,500,.7)
> p<-x/500
> ll<- p-qnorm(.99)*sqrt(p*(1-p)/500)
> ul<- p+qnorm(.99)*sqrt(p*(1-p)/500)
> out<- ul[ul<.7]
> out
[1] 0.6996227 0.6996227 0.689938

> out <- ll[ll>.7]
> out
[1] 0.7091933

Note: in this simulation 4 of the intervals did not contain 0.7.