F3

Jeremiah Theisen

2024-10-17

4.3.1

a. phat = 0.64 SEp = 0.096

b. 0.18816

c. (.45184, .8282), 0.5 fits in the range. The true proportion lies within this interval. The coin is more likely to be fair.

4.3.2

a. phat = 0.14 SEp = 0.04907

b. C = 0.096, (0.044, 0.236)

c. 0.5 does not fall into that variable.

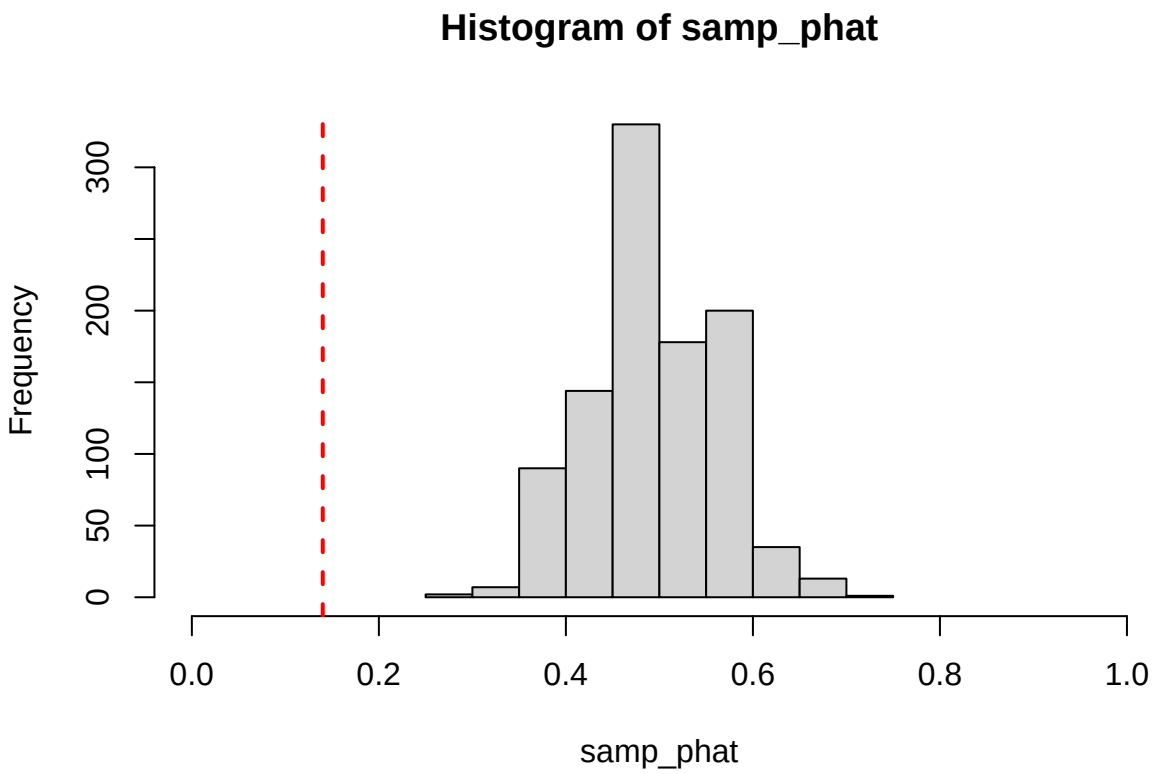
d.

```
numsamp=1000
  n=50
  p=0.5

  samp_phat = rep(NA, numsamp)

  for(i in 1:numsamp){
  samp = rbinom(1,n,p) # obtain a sample of size n  from the population
  samp_phat[i] = samp/n    # Find the proportion for this sample
}

hist(samp_phat, xlim = c(0,1))
abline(v = 0.14, lwd = 2, lty = 2, col = "red")
```



4.3.3

a. p = 0.5 SEp = 0.034 sd = 0.5

USE SAMPLING ERROR b.

```
1 - pnorm(122/212, mean = 0.5, sd = 0.03434)
```

```
## [1] 0.01398246
```

c. 1%

4.3.4

a. pvalue = 0.014 alpha = 0.05 pvalue < alpha

b. Since alpha is greater, we reject the null hypothesis that candidates are tied, and conclude that our candidate has more than 0.5 support.

4.3.5 SKIP

4.3.6

a. H0: p = 0.6

b. HA: $p < 0.6$

c. phat = 0.5

d. mean = 0.6,
SEp = 0.0692

e.

```
pnorm(0.5, mean=0.6, sd=0.0693)
```

```
## [1] 0.07451003
```

f. The pvalue is 0.0745. The pvalue is the probability that the proportion from the sample fits in the distribution calculated from the null hypothesis.

g. No, the pvalue is less than alpha which is 0.05

h. Type 2, to be incorrect the null hypothesis would be wrong but we did not reject it.

4.3.7 SKIP

4.3.8 SKIP

4.3.9 SKIP

4.3.10

a.

```
prop.test(16, 40,
    p=0.3, alternative="greater", correct=FALSE)
```

```
##
##  1-sample proportions test without continuity correction
##
## data:  16 out of 40, null probability 0.3
## X-squared = 1.9048, df = 1, p-value = 0.08377
## alternative hypothesis: true p is greater than 0.3
## 95 percent confidence interval:
##  0.2828648 1.0000000
## sample estimates:
##   p
## 0.4
```

b.

```
prop.test(12, 60,
    p=0.45, alternative="less", correct=FALSE)
```

```
##
##  1-sample proportions test without continuity correction
##
## data:  12 out of 60, null probability 0.45
## X-squared = 15.152, df = 1, p-value = 4.961e-05
## alternative hypothesis: true p is less than 0.45
## 95 percent confidence interval:
##  0.0000000 0.2970335
## sample estimates:
##   p
## 0.2
```

c.

```
prop.test(88, 100,
    p=0.5, alternative="two.sided", correct=FALSE)
```

```
##
##  1-sample proportions test without continuity correction
##
## data:  88 out of 100, null probability 0.5
## X-squared = 57.76, df = 1, p-value = 2.961e-14
## alternative hypothesis: true p is not equal to 0.5
## 95 percent confidence interval:
##  0.8018790 0.9300059
## sample estimates:
##    p
## 0.88
```