**Assignment 5.1**

1. If Z is norm (mean = 0, sd = 1)

Find P(Z > 2.64)

**Answer -**

pnorm(2.64, lower.tail = FALSE)

[1] 0.004145301

Find P(|Z| > 1.39)

**Answer -**

2 \* pnorm(-1.39)

[1] 0.1645289

2. Suppose p = the proportion of students who are admitted to the graduate school of the University of

California at Berkeley, and suppose that a public relation officer boasts that UCB has historically had a

40% acceptance rate for its graduate school. Consider the data stored in the table UCBAdmissions from

1973. Assuming these observations constituted a simple random sample, are they consistent with the

officerâ..s claim, or do they provide evidence that the acceptance rate was significantly less than 40%?

Use an Î± = 0.01 significance level.

**Answer –**

Our null hypothesis in this problem is H0 : p = 0.4 and the alternative hypothesis is H1 : p < 0.4. We reject the null hypothesis if ˆp is too small, that is, if

pˆ − 0.4 √ 0.4(1 − 0.4)/n < −zα,

where α = 0.01 and −z0.01 is

> -qnorm(0.99)

[1] -2.326348

> A<-as.data.frame(UCBAdmissions)

> head(A)

    Admit Gender Dept Freq

1 Admitted   Male A 512

2 Rejected   Male A 313

3 Admitted Female    A 89

4 Rejected Female    A 19

5 Admitted   Male B 353

6 Rejected   Male B 207

> xtabs(Freq ~ Admit, data = A)

Admit

Admitted Rejected

   1755     2771

> phat <- 1755/(1755 + 2771)

> (phat - 0.4)/sqrt(0.4 \* 0.6/(1755 + 2771))

[1] -1.680919

Our test statistic is not less than −2.32, so it does not fall into the critical region. Therefore, we ***fail to reject the null hypothesis*** that the true proportion of students admitted to graduate school is less than 40% and say that the observed data are consistent with the officer’s claim at the α = 0.01 significance level.