

1. Problem Statement

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

find $P(Z > 2.64)$

find $P(|Z| > 1.39)$

Answer :

```
> pnorm(2.64, mean = 0, sd = 1, lower.tail = FALSE)
[1] 0.004145301
> 1 - (pnorm(1.39, mean = 0, sd=1) - pnorm(-1.39, mean = 0, sd=1))
[1] 0.1645289
```

find $P(Z > 2.64)$: 0.004145301

find $P(|Z| > 1.39)$: 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 UCBAAdmissions from 1973. Assuming these observations constituted a simple random sample, are they consistent with the officer's claim, or do they provide evidence that the acceptance rate was significantly less than 40%? Use an $\hat{\alpha} = 0.01$ significance level.

Answer :

```
> View(UCBAAdmissions)
```

RStudio

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Untitled1* x UCBAAdmissions x

Filter

	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
7	Admitted	Female	B	17
8	Rejected	Female	B	8
9	Admitted	Male	C	120
10	Rejected	Male	C	205
11	Admitted	Female	C	202
12	Rejected	Female	C	391
13	Admitted	Male	D	138
14	Rejected	Male	D	279
15	Admitted	Female	D	131
16	Rejected	Female	D	244
17	Admitted	Male	E	53
18	Rejected	Male	E	138
19	Admitted	Female	E	94
20	Rejected	Female	E	299
21	Admitted	Male	F	22
22	Rejected	Male	F	351
23	Admitted	Female	F	34

Showing 1 to 23 of 24 entries

```
> class(UCBAAdmissions)
[1] "table"
> -qnorm(0.99)
[1] -2.326348
> A <- as.data.frame(UCBAAdmissions)
> 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
> prop.test(1755, 1755 + 2771, p = 0.4, alternative = "less",
+           + conf.level = 0.99, correct = FALSE)
```

```
Error: unexpected '=' in:
"prop.test(1755, 1755 + 2771, p = 0.4, alternative = "less",
+ conf.level = "
> prop.test(1755, 1755 + 2771, p = 0.4, alternative = "less", conf.level =
0.99, correct = FALSE)
```

1-sample proportions test without continuity correction

```
data: 1755 out of 1755 + 2771, null probability 0.4
X-squared = 2.8255, df = 1, p-value = 0.04639
alternative hypothesis: true p is less than 0.4
99 percent confidence interval:
 0.0000000 0.4047326
sample estimates:
      p
0.3877596
```

```
> library(IPSUR)
Warning message:
package 'IPSUR' was built under R version 3.5.2
> library(HH)
Loading required package: lattice
Loading required package: grid
Loading required package: latticeExtra
Loading required package: RColorBrewer
Loading required package: multcomp
Loading required package: mvtnorm
Loading required package: survival
Loading required package: TH.data
Loading required package: MASS
```

Attaching package: 'TH.data'

The following object is masked from 'package:MASS':

geyser

```
Loading required package: gridExtra
Warning messages:
1: package 'HH' was built under R version 3.5.2
2: package 'latticeExtra' was built under R version 3.5.2
3: package 'RColorBrewer' was built under R version 3.5.2
4: package 'multcomp' was built under R version 3.5.2
5: package 'mvtnorm' was built under R version 3.5.2
6: package 'TH.data' was built under R version 3.5.2
7: package 'gridExtra' was built under R version 3.5.2
> library(ggplot2)
```

Attaching package: 'ggplot2'

The following object is masked from 'package:latticeExtra':

layer

```
Warning message:
package 'ggplot2' was built under R version 3.5.2
> temp <- prop.test(1755, 1755 + 2771, p = 0.4, alternative =
+ "less", conf.level = 0.99, correct = FALSE)
> par(mfrow = c(1,1))
> plot(temp, "Hypoth")
```

