

Statistical Inference Theory - Lab 5

Code ▾

CB.SC.I5DAS20032

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```
library(MASS)
head(survey)
```

Sex <fctr>	Wr.Hnd <dbl>	NW.Hnd <dbl>	W.Hnd <fctr>	Fold <fctr>	Pulse <int>	Clap <fctr>	Exer <fctr>	Smoke <fctr>	
1 Female	18.5	18.0	Right	R on L	92	Left	Some	Never	
2 Male	19.5	20.5	Left	R on L	104	Left	None	Regul	
3 Male	18.0	13.3	Right	L on R	87	Neither	None	Occas	
4 Male	18.8	18.9	Right	R on L	NA	Neither	None	Never	
5 Male	20.0	20.0	Right	Neither	35	Right	Some	Never	
6 Female	18.0	17.7	Right	L on R	64	Right	Some	Never	

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```
gender.response = na.omit(survey$Sex)
gender.response
```

```

[1] Female Male   Male   Male   Male   Female Male   Female Male   Male   Female Male   Fem
ale
[14] Female Male   Female Female Male   Male   Male   Male   Male   Male   Male   Female Mal
e
[27] Male   Male   Male   Male   Female Male   Female Male   Male   Male   Male   Female Male   Mal
e
[40] Male   Female Female Male   Female Female Male   Male   Male   Female Female Male   Mal
e
[53] Male   Male   Male   Male   Female Male   Male   Male   Male   Female Female Female Fem
ale
[66] Male   Female Female Male   Male   Female Male   Female Female Female Female Female Fem
ale
[79] Female Male   Male   Male   Female Female Male   Female Female Female Male   Female Mal
e
[92] Female Female Female Male   Female Male   Female Male   Female Male   Male   Female Fem
ale
[105] Female Female Female Female Male   Male   Female Male   Female Male   Female Female Fem
ale
[118] Male   Female Male   Male   Male   Female Male   Male   Male   Female Male   Female Fem
ale
[131] Male   Male   Female Female Male   Male   Male   Male   Female Female Female Female Mal
e
[144] Female Male   Male   Male   Female Female Male   Female Female Male   Male   Male   Mal
e
[157] Female Male   Male   Female Male   Male   Female Male   Female Female Female Male   Mal
e
[170] Female Male   Female Female Female Female Male   Female Female Female Male   Female Fem
ale
[183] Male   Male   Male   Female Male   Male   Male   Male   Male   Male   Female Female Fem
ale
[196] Female Male   Female Female Female Male   Female Female Male   Female Female Male   Mal
e
[209] Female Female Female Male   Male   Female Male   Female Male   Female Male   Male   Fem
ale
[222] Female Female Female Female Female Male   Female Male   Female Male   Female Female Fem
ale
[235] Male   Female
attr(,"na.action")
[1] 137
attr(,"class")
[1] omit
Levels: Female Male

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```

n = length(gender.response)
n

```

```

[1] 236

```

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```

k = sum(gender.response == "Female")
k

```

```
[1] 118
```

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```
pbar = k/n  
pbar
```

```
[1] 0.5
```

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```
SE = sqrt(pbar*(1 - pbar)/n)  
SE
```

```
[1] 0.03254723
```

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```
E = qnorm(0.975)*SE  
E
```

```
[1] 0.06379139
```

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```
pbar + c(-E, E)
```

```
[1] 0.4362086 0.5637914
```

Using a 50% planned proportion estimate, find sample size needed to achieve 5% margin of error for the female students survey at 95% confidence level.

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```
prop.test(k, n)
```

1-sample proportions test with continuity correction

```
data: k out of n, null probability 0.5
X-squared = 56.364, df = 1, p-value = 6.023e-14
alternative hypothesis: true p is not equal to 0.5
95 percent confidence interval:
 0.2619062 0.3563692
sample estimates:
      p
0.307175
```

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```
z = qnorm(0.975)

p = 0.5
E = 0.05
n = z^2*p*(1-p)/E^2

n
```

```
[1] 384.1459
```

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```
Xi = c(1.9, 4.2, 3.7, 2.6, 4.4, 1.1, 2.5, 1.5, 4.9, 1.3, 3.7, 3.9, 3.5, 4.8, 4.2, 3.2)
```