1. If we consider collected data as a representative sample of Sri lankan people with Sinhala literacy, is this evidence of females as a proportion, rejecting mobile banking more compared to males?

Female = 38	Male = 28	Total = 66

p: proportion of females who reject mobile banking
p^ = 38/66 = 0.576

np = 66*0.5 = 33 >=10
n(1-p) = 66*0.5 = 33 >=10
Therefore a normal distribution can be used to approximate the distribution of $\hat{p}$

H_0: p = 0.5
H_a: p > 0.5
$z = (\hat{p} - p_0)/\sqrt{((p_0 (1-p_0))/n)} = 1.235$
p-value = 0.108
Based on this data, there is no evidence of females as a proportion, rejecting mobile banking more compared to males

2. Does the proportion of people who reject mobile banking are all equal among age groups?
   $p_{16 - 25}$: proportion of people in 16-25 yrs range who reject mobile banking
   p_{26-45}: proportion of people in 26-45 yrs range who reject mobile banking
   $p_{46 - 60}$: proportion of people in 46-60 yrs range who reject mobile banking
   $P_{above\ 60}$: proportion of people above 60 yrs range who reject mobile banking

   H_0: $p_{16 - 25} = p_{26 - 45} = p_{46-60} = p_{above\ 60} = 0.25$
   H_a: at least one p_i is not as specified in the null

	16-25	26-45	46-60	Above 60	Total
Observed	11	30	12	13	
Expected	16.5	16.5	16.5	16.5	
Chi-square value	1.833	11.045	1.227	0.742	14.847

   df = 4-1 =3
   chi square value = 14.847
   The P-Value is 0.001952. The result is significant at p < 0.05

Therefore null hypothesis can be rejected. Therefore there is strong evidence one proportion is not as specified in the null.

3. Based on these data, can we conclude whether 25-45 or 45-60 are significantly more with no income in the context of rejecting mobile banking?

	16-45	46-60	total
Having income	26	8	34
No income	15	4	19
total	41	12	53

p_{16-45}: proportion of people in 16-45 yrs range who reject mobile banking with no income
p_{46-60}: proportion of people in 46-60 yrs range who reject mobile banking with no income

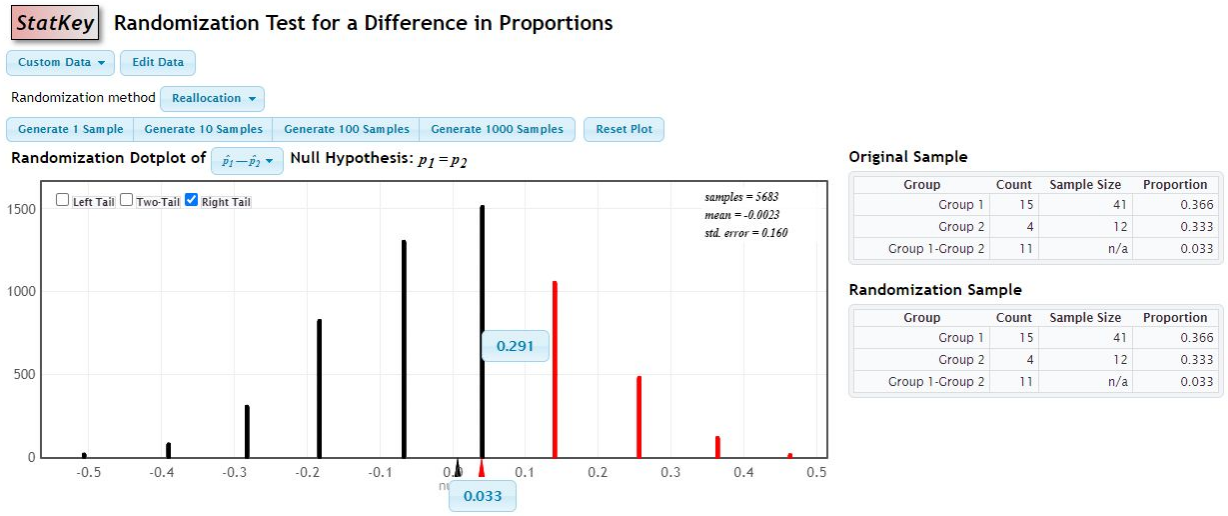
p^ = 15+4/(41+12) = 0.358

When n=41
$np\hat{}$ = 41*0.358 = 14.678 ≥10 and $n(1-p\hat{})$ = 26.322≥10

When n=12
$np\hat{}$ = 12*0.358 = 4.296 < 10 and $n(1-p\hat{})$ = 7.38 < 10

Therefore we should go with a randomization test for a difference in proportions.

H_0: $p_{16-45} = p_{46-60}$
H_a: $p_{16-45} > p_{46-60}$



Group 1: people in 16-45 yrs range who reject mobile banking with no income
Group 1: people in 46-60 yrs range who reject mobile banking with no income

There is no evidence to reject H_0.

4. Do the data provide sufficient evidence to conclude that the people who reject mobile banking do not have trust issues?
   p_{trust_issues}: proportion of people who have trust issues

   np = 66*0.5 = 33 >=10
   n(1-p) = 66*0.5 = 33 >=10
   Therefore a normal distribution can be used to approximate the distribution of $\hat{p}$

   H_0: p_{trust_issues}= 0.5
   H_a: p_{trust_issues}< 0.5
   N = 66

Having trust issues = 26	Not having trust issues = 40	Total = 66

   Sample proportion p^ = 26/66 = 0.394
   Z = (p^ - p0)/(p0(1-p0)/n)1/2 = -1.722

   p-value is 0.043<0.05 (significance level). We can reject H_0 and conclude that there is evidence that the people who reject mobile banking do not have trust issues.

5. Does the data provide sufficient evidence to conclude that the most people who stopped using mobile banking not because of trust issues?
   p_{trust_issues}: proportion of people who had security issues
   H_0: p_{trust_issues}= 0.5
   H_a: p_{trust_issues}< 0.5
   N = 24

   np = 24*0.5 = 12 >=10
   n(1-p) = 24*0.5 = 12 >=10
   Therefore a normal distribution can be used to approximate the distribution of $\hat{p}$

Had security issues = 4	Did not have trust issues = 20	Total = 24

   Sample proportion p^ = 4/24 = 0.167
   Z = (p^ - p0)/(p0(1-p0)/n)1/2 = -3.263

   p-value is 0.00055 < 0.05 (significance level). We can reject H_0 and conclude that there is strong evidence that the people who stopped using mobile banking not because of trust issues.

6. Do the proportions of people who reject mobile banking after using that, are all equal among security, complexity, and charges reasons?

$p_{\text{security issues}}$: proportion of people who rejected mobile banking due to security reasons

$p_{\text{complexity issues}}$: proportion of people who rejected mobile banking due to complexity reasons

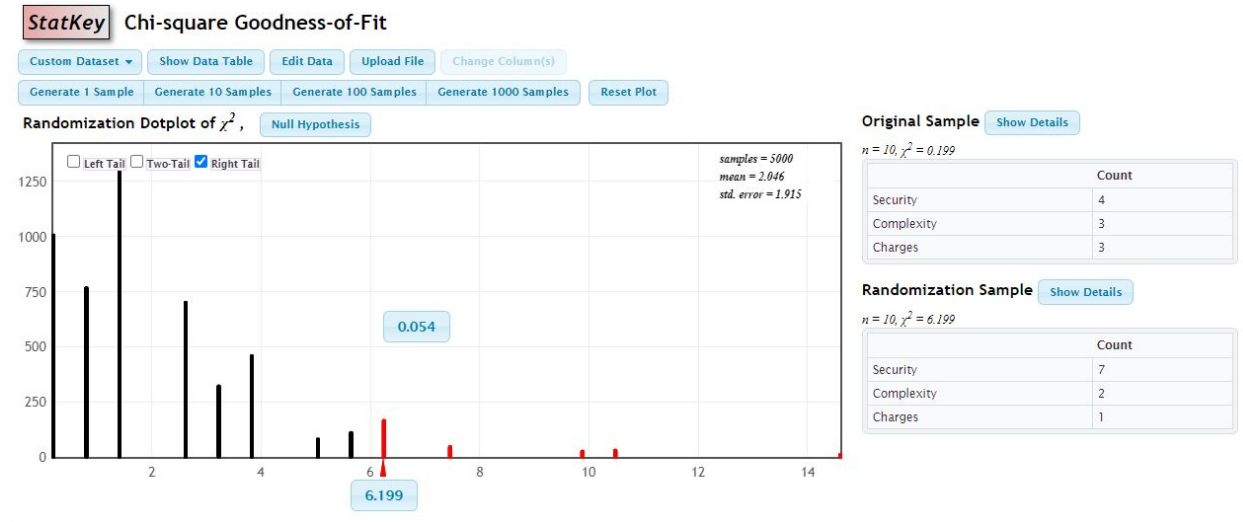
$p_{\text{charges issues}}$: proportion of people who rejected mobile banking due to high charges

H_0: $p_{\text{security issues}} = p_{\text{complexity issues}} = p_{\text{charges issues}} = 0.33$

H_a: at least one p_i is not as specified in the null

	Security issues	Complexity issues	Charges issues
Observed	4	3	3
Expected	3.33	3.33	3.33

As the expected values are less than 5, a randomization test should be conducted.



P-value = 0.181, therefore null hypothesis cannot be rejected. The proportions of people who reject mobile banking after using that, are all equal among all reasons.

7. Does the proportion of people who reject mobile banking after using that are all equal among all reasons?

$p_{\text{security issues}}$: proportion of people who rejected mobile banking due to security reasons

$p_{\text{complexity issues}}$: proportion of people who rejected mobile banking due to complexity reasons

$p_{\text{charges issues}}$: proportion of people who rejected mobile banking due to high charges

$p_{\text{other issues}}$: proportion of people who rejected mobile banking due to other reasons

H_0: $p_{\text{security issues}} = p_{\text{complexity issues}} = p_{\text{charges issues}} = p_{\text{other issues}} = 0.25$

H_a: at least one p_i is not as specified in the null

	Security issues	Complexity issues	Charges issues	Other issues
Observed	4	3	3	11
Expected	5.25	5.25	5.25	5.25

df = 4-1 =3

chi square value = 8.524

The P-Value is 0.036. The result is significant as $p < 0.05$

Therefore null hypothesis can be rejected. Therefore there is strong evidence one proportion is not as specified in the null.

8. Is there an association between the perception of app complexity and education level?

H_0 : perception of app complexity is not associated with education level of the people who reject mobile banking

H_a : perception of app complexity is associated with education level of the people who reject mobile banking

	Masters / PHD (Expected)	Degree/Diploma (Expected)	A/L (Expected)	Secondary (Upto O / L) (Expected)	Other (Expected)	total
demo needed	3(3.273)	33(31.909)	10(9)	7(6.545)	1(3.273)	54
no	1(0.727)	6(7.091)	1(2)	1(1.455)	3(0.727)	12
total	4	39	11	8	4	66

As expected values are less than 5, we should go with randomization test

	Masters / PHD	Degree/Diploma	A/L	Secondary Upto O / L	Other	Total
demo needed	3	33	10	7	1	54
no demo needed	1	6	1	1	3	12
Total	4	39	11	8	4	66

	Masters / PHD	Degree/Diploma	A/L	Secondary Upto O / L	Other	Total
demo needed	4	32	6	8	4	54
no demo needed	0	7	5	0	0	12
Total	4	39	11	8	4	66

p= 0.052

Therefore null hypothesis cannot be rejected. Therefore there is no evidence to reject that education level is not associated with which perception of app complexity of the people who reject mobile banking.

9. Do people who reject mobile banking believe the app is complex and difficult to learn on its own?

   p_{demo}: proportion of people who needed demo

   H_0: $p_{demo} = 0.5$

   H_a:$p_{demo} > 0.5$

   np = 66*0.5 = 33<10, n(1-p) = 11<10

   Test statistics are calculated using p_{demo}.

   In the collected dataset,

Demo needed = 54	Demo not needed = 12	Total = 66

   p_0 = 0.5, p^ = 54/66 = 0.818, n= 66

   z = 5.166

   The P-Value is < .00001<0.05

   This is a right-tail test, and we see that the area to the right of 5.166 in a normal distribution is less than 0.00001. We can reject H_0. Therefore, there is evidence that most people who reject mobile banking believe the app is complex and difficult to learn on its own.

10. Do people who reject mobile banking are confident with banking transactions?

    p: proportion of people who are not confident about the knowledge of banking transactions

    H_0: p = 0.5

    H_a:p > 0.5

    In the collected dataset,

Familiar with transactions = 40	Not familiar with transactions = 26	Total = 66

    p_0 = 0.5, p^ = 40/66 = 0.394, n= 66

    z = 1.723

    The P-Value is 0.042 < 0.05

    This is a right-tail test, and we see that the area to the right of 1.723 in a normal distribution is less than 0.042. We can reject H_0. Therefore, there is evidence that most people who reject mobile banking are confident with banking transactions.

11. Do people who reject mobile banking believe the mobile banking app is very expensive and not worth the cost?

    p: proportion of people who believe the mobile banking app is very expensive and not worth the cost

H_0: p = 0.5

H_a:p > 0.5

Test statistics are calculated using p.

In the collected dataset,

Demo needed = 54	Demo not needed = 12	Total = 66

p_0 = 0.5, p^ = 54/66 = 0.818, n= 66

np = 66*0.5 = 33<10, n(1-p) = 11<10

z = 5.166

The P-Value is < .00001<0.05

This is a right-tail test, and we see that the area to the right of 5.166 in a normal distribution is less than 0.00001. We can reject H_0. Therefore, there is evidence that people who reject mobile banking believe the mobile banking app is very expensive and not worth the cost

12. Is there evidence that most non users of mobile banking apps stay at the bank less than 10 mins per week?

p: proportion of people who stay at the bank less than 10 mins per week in the context of not using mobile banking apps

H_0: p = 0.5

H_a: p > 0.5

np = 66*0.5 = 33<10, n(1-p) = 11<10

In the collected dataset,

stay at the bank less than 10 mins per week = 49	stay at the bank more than 10 mins per week= 17	Total = 66

p_0 = 0.5, p^ = 49/66 = 0.742, n= 66

z = 3.932

The P-Value is 0.00004 < 0.05

We can reject H_0. Therefore, there is strong evidence that most people who reject mobile banking stay at the bank less than 10 mins.