WEEK 10 REPORT – CHI-SQUARE TEST

Group Number: 25
Date and Time of Tutorial Session: Wednesday 4:00 – 5:30 pm
Group Members (First and Last name – no student numbers):

1. Katarzyna Fraser
2. Annika Tran
3. Ella Pustil
4. Hanna Aslin

Graded out of 10 marks.

1. Create a contingency table of political affiliation and race/ethnicity and compute the marginal distributions as proportions (to 3 decimal places).
(1.5 mark)

	Democrat	Independent	Republican	Unsure/Refused	
Asian American	285	264	56	10	0.060
Black	845	395	42	50	0.130
Hispanic	793	688	267	96	0.180
White	1693	2364	2136	261	0.630
	0.353	0.362	0.244	0.041	10245

2. What type of test should be used to analyze the data and determine whether political affiliation and race/ethnicity are independent? Briefly explain why (in one sentence).
(0.5 mark)

Since we're testing for independence between two categorical variables (political affiliation and race/ethnicity), a chi-square test of independence is appropriate because it will allow us to see if there's an association between race/ethnicity and political affiliation.

3. a) What are the null and alternative hypotheses for this test?
(1 mark)

Null Hypothesis (H0) - Political affiliation and race/ethnicity are independent from each other (meaning there is no association between these variables).
Alternative Hypothesis (H1) - Political affiliation and race/ethnicity are not independent from each other (meaning there is an association between these variables).

b) Is this a one-tailed or two-tailed test. Briefly explain why.
(0.5 mark)

This would be a two-tailed test because we are interested in whether any association exists regardless of direction.

4. If the null hypothesis is correct, what is the expected frequency (count) for:
(2 marks)

a) People identifying as White who affiliate with the Republican Party?

1575.545

b) People identifying as Black who affiliate with the Democratic Party?

470.133

c) People identifying as Asian American who affiliate with an independent?

222.769

d) People identifying as Hispanic who affiliate with the Democratic Party?

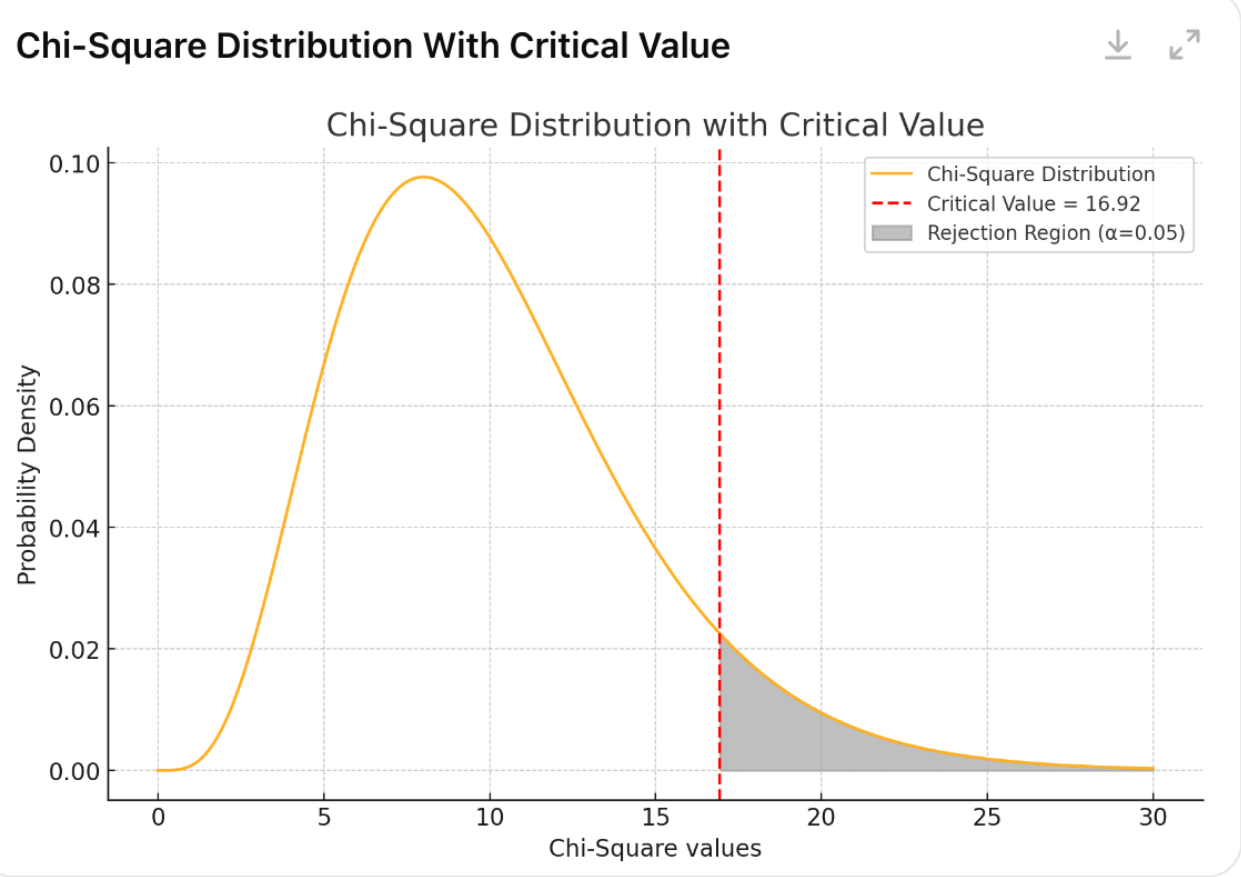
650.845

5. What is the *statistical* conclusion of your test (i.e. do you reject or fail to reject the null hypothesis)? Explain your statistical conclusion in text and report your chi-square value, alpha value, and p-value in brackets.
(1 mark)
Since the p-value is less than 0.05, it would reject the null hypothesis. Chi-square value: 1120.53, alpha:0.05, p-value: 1.73 x 10^(-235), the results show that the statistically significant association between political party and race means that's the variables are not independent of each other.

6. a) Calculate the critical chi-square statistic and compare this value to the observed chi-square statistic. Based on your critical and observed chi-square statistics, is there sufficient evidence to reject the null hypothesis?
(1 mark)

Critical chi-square statistic is 16.92 compared to the observed which is 1120.53, the two are very different, which supports it would rejects the null hypothesis.

b) Include a photo of your sketched chi-square distribution here. Draw and label your critical chi-square statistic on your sketch and shade in the corresponding probability for your alpha-value. Don't add your observed Chi-squared value or shade the p-value for this sketch.
(1 mark)



7. What is the *scientific* or *situational* conclusion of your test (i.e. How does party affiliation vary by race/ethnicity)?
(0.5 mark)

The conclusion is that the correlation between race and party is strong, and it suggests that the variables are not independent of each other. This suggests that a race may be more inclined to vote for a certain party. This can be used for campaign strategies and recognizing patterns that work.

8. Compare your expected count from 4b) to the corresponding observed count in Question 1. What does this tell you? Based on the chi-square test, if the proportion of people identifying as Black in the US increases, how might this impact voting?
(1 mark)
The results from 4b) was about 470.13 while the observed is 845, this shows that there is a strong correlation between people who identify as black and the party they voted for. If the population of black increased, there would probably be more support for Democratic.

Notes:

- **Only one group member submits the report**
- **The report must be a Word .DOC, .DOCX or .PDF file**
- **Make sure everyone in the group has a copy of the report**
- **Double check what you have submitted!!**
    - **view it on OnQ to make sure everything is there and visible**
- **Lastly, everyone in the group needs to submit their own version of the Rscript file.**