\*\*State the null and alternative hypotheses for this test:\*\*

- \*\*Null Hypothesis (H₀):\*\* There is no association between the average number of hours per week that students work part-time and their perception of the effect of part-time work on academic achievement. In other words, the variables are independent.

- \*\*Alternative Hypothesis (H₁):\*\* There is an association between the average number of hours per week that students work part-time and their perception of the effect of part-time work on academic achievement. In other words, the variables are dependent.

\*\*Discuss whether the conditions for a chi-square inference procedure are met for these data:\*\*

1. \*\*Random Sampling:\*\* The data were collected from a simple random sample of 200 students out of more than 20,000, which satisfies the condition of random sampling.

2. \*\*Expected Cell Counts:\*\* For a chi-square test, all expected cell counts should be at least 5. From the output, we can see that all expected counts are greater than 5, which meets this condition.

3. \*\*Independence:\*\* Each student's response is independent of the others, as they were sampled randomly and each student provided one response.

Given these points, the conditions for performing a chi-square test are met.

\*\*Given the results from the chi-square test, what should the advisory board conclude?\*\*

The chi-square test statistic is 13.938 with a p-value of 0.007. Since the p-value (0.007) is less than the conventional significance level of 0.05, we reject the null hypothesis. Therefore, the advisory board should conclude that there is statistically significant evidence to suggest that there is an association between the average number of hours per week that students work part-time and their perception of the effect of part-time work on academic achievement.

\*\*Based on your conclusion in part (c), which type of error (Type I or Type II) might the advisory board have made? Describe this error in the context of the question.\*\*

Since we rejected the null hypothesis, the potential error the advisory board might have made is a \*\*Type I error\*\*. A Type I error occurs when we incorrectly reject a true null hypothesis. In the context of this question, a Type I error would mean that the advisory board concluded there is an association between part-time work hours and the perception of its effect on academic achievement when, in reality, there is no such association. This could lead to unnecessary policy changes or interventions based on a false premise.