\*\*a) Null and Alternative Hypotheses:\*\*

The null hypothesis (H₀) for this chi-square test of independence is that there is no association between the average number of hours worked per week and the perceived effect of part-time work on academic achievement. In other words, the variables are independent.

The alternative hypothesis (Hₐ) is that there \*is\* an association between the average number of hours worked per week and the perceived effect of part-time work on academic achievement. The variables are dependent.

\*\*b) Conditions for Chi-Square Inference:\*\*

The conditions for a chi-square test of independence are:

1. \*\*Random Sample:\*\* The problem states that a simple random sample of 200 students was selected from a population of over 20,000 students. This condition is met.

2. \*\*Independence:\*\* Within the sample, the responses of different students should be independent. This is reasonably assumed to be true, though not explicitly guaranteed by the problem description.

3. \*\*Expected Counts:\*\* All expected counts must be at least 5. Examination of the computer output shows that all expected counts are greater than 5. This condition is met.

Therefore, the conditions for the chi-square inference procedure appear to be met.

\*\*c) Advisory Board Conclusion:\*\*

The p-value from the chi-square test is 0.007. This is less than a standard significance level of α = 0.05. Therefore, we reject the null hypothesis. The advisory board should conclude that there is statistically significant evidence of an association between the average number of hours worked per week and the perceived effect of part-time work on academic achievement.

\*\*d) Type of Error:\*\*

Because we rejected the null hypothesis, the advisory board might have made a Type I error. A Type I error occurs when we reject a true null hypothesis. In this context, it would mean concluding that an association exists between part-time work hours and academic achievement when, in reality, no such association exists. This could lead to the university implementing unnecessary policies or interventions based on a false finding.