**1. Market researchers working for a large fitness company want to know if male and female patrons differ in terms of how many hours per week they spend at the gym. At their gym, customers have ID cards that they use to sign in and out of the gym, so the researchers are able to obtain data concerning how long each customer was in the gym. They obtain data from a random sample of 50 male patrons and 50 female patrons.**

**A. What is the independent variable?**

**B. What is the dependent variable?**

**C. Is the dependent variable categorical or quantitative? Explain why.**

**D. Are the two groups (males and females) independent or paired? Explain why.**

**E. Write the null and alternative hypotheses that the researchers should be testing. Use the Equation Editor in Word and the correct notation.**

**F. What type of graph could the researchers make to display their data? Explain why.**

**G. What method of constructing a sampling distribution should the researchers use (e.g., randomization, t distribution, z distribution)? Explain why.**

**2. At the beginning of the Summer 2017 semester a random sample of Penn State students enrolled in online sections of STAT 200 were surveyed and asked for their employment status and primary campus. These data are presented in the contingency table below.**

|  |  |
| --- | --- |
|  | **Primary Campus** |
| **Employment Status** | **World Campus** | **Physical Campus** |
| **Full Time** | **27** | **12** |
| **Less Than Full Time** | **11** | **34** |

1. **What proportion of World Campus students in this sample were working full time?**
2. **What proportion of students in this sample who typically attend a physical campus were working full time?**

**C. Use the five-step hypothesis testing procedure to determine if the proportion of World Campus students who were working full time is different from the proportion of students from physical campuses who were working full time. If assumptions are met, use the normal approximation method. Do not do any calculations by hand. Use Minitab Express and remember to include all relevant output.**

Step 1: Check assumptions and write hypotheses

Step 2: Calculate the test statistic

Step 3: Determine the p-value

Step 4: Decide between the null and alternative hypotheses

Step 5: State a real world conclusion

1. **Are your results in part C practically significant? Explain why or why not.**
2. **Construct a 95% confidence interval for the difference in the proportion of World Campus students and students who typically attend a physical campus who are working full-time. Show how you checked assumptions. If assumptions are met, use the normal approximation method. Do not do any calculations by hand.**