Edhesive AP Statistics **Unit 10, Lesson 3– Solutions**

**Multiple Choice:** Choose the best answer choice for the following problems.

*Questions 1-5 apply to the following situation*

In order to assess the demographic trend surrounding the debate around marijuana legalization, a study interviewed a random sample of 1,808 people below the age of 35 and 1,763 people over the age of 35 from around the country and asked them to choose which opinion most closely matched their own. Here are the results:

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| --- | --- | --- | --- |
| **Opinion** | **Age < 35** | **Age > 35** | **Totals** |
| I favor total legalization | 534 | 97 | 631 |
| I favor legalization but with restrictions and limitations | 422 | 302 | 724 |
| I favor medical legalization but not recreational use | 415 | 365 | 780 |
| I favor almost no legalization, with few exceptions for extreme cases | 125 | 482 | 607 |
| I favor no legalization | 312 | 517 | 829 |
| **Totals** | 1808 | 1763 | 3571 |

1. When designing a chi-squared test of homogeneity for this data, what is the appropriate null hypothesis to test against?
   1. The same proportion of people in both age groups favor total legalization
   2. There is no association between age and opinions about legalization in the population
   3. There is no difference between the distributions of the two age groups’ opinions about legalization in the population
   4. There is no association between age and opinions about legalization in the sample
   5. There is no difference between the distributions of the two age groups’ opinions about legalization in the sample
2. What is the expected count of people over the age of 35 that support no legalization?
   1. 357.1
   2. 352.6
   3. 409.3
   4. 414.5
   5. 517.0
3. If the test is to be conducted at a level, what value of will mean there is sufficient evidence to reject the null hypothesis?

1. This test results in a value of and a P-value near 0.0. Assuming a significance level of 0.01, which of the following are true?

* 1. Type I error possible and extremely likely
  2. Type II error possible and extremely likely
  3. Type I error possible but extremely unlikely
  4. Type II error possible but extremely unlikely
  5. Both types of errors are possible

1. Which of the following would *NOT* display information about the differences of opinions between age groups?
2. A bar chart showing the marginal distribution of opinion about marijuana legalization
3. A bar chart showing the marginal distribution of age group
4. A bar chart showing the conditional distribution of age group for each opinion
5. A bar chart showing the conditional distribution of opinion for each age group
   1. All of these display information about differences in opinion by between age groups
   2. IV only
   3. III and IV
   4. I only
   5. I and II

**Free Response – Solutions**

1. Stacy works for the state of California and manages all of the food orders for the state’s zoos. In order to try to get a discount from the manufacturer, she wants to use one brand for all of the zoos. She conducts a study in which a SRS of a few types of animals are given different brands of food. The table below shows the number of each type of animal that was found to prefer each type of food.

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| --- | --- | --- | --- | --- |
|  | **Zoo Food** | **Safari Nibs** | **Healthy Monkey** | Totals |
| **Lions** | 8 | 10 | 7 | 25 |
| **Hippos** | 23 | 21 | 17 | 61 |
| **Giraffes** | 12 | 15 | 9 | 36 |
| Totals | 43 | 46 | 33 | 122 |

* 1. Fill out the table below with the appropriate conditional distributions based on the data collected above for comparing the food preference of the three different animals.

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| --- | --- | --- | --- |
|  | **Zoo Food** | **Safari Nibs** | **Healthy Monkey** |
| **Lions** |  |  |  |
| **Hippos** |  |  |  |
| **Giraffes** |  |  |  |

* 1. In the space below, present the data from part (a) graphically and comment on the relationship between the type of animal and their food brand preference.

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* 1. Conduct the appropriate statistical test to determine if the food brand preference varies between the three types of animals.

* 1. If you chose a chi-square test of homogeneity for part (c), explain how the data could have been collected to make a chi-square test for independence. If you chose a chi-square test of independence for part (c), explain how the data could have been collected to make a chi-square test for homogeneity.