**AP Statistics Name \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**Chapter 11 Practice**

1. Researchers were interested in determining if the ethnic distribution of college graduates in California differs from that of the state population as a whole. Suppose that a random sample of 1000 students graduating from California colleges and universities in 1998 was taken. The data from the sample and the Census Bureau information about the population of the state is given in the table below:

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Ethnic Group** | White | Black | Hispanic | Asian | Other |
| **# in Sample** | 679 | 51 | 77 | 190 | 3 |
| **Census Data for Population** | 50.7% | 6.6% | 30.6% | 10.8% | 1.3% |

Do these data provide evidence that the proportion of students graduating from California colleges and universities for these ethnic group categories differs from the respective proportions in the population for California? Test the appropriate hypothesis using α = .01.

1. The data on drinking behavior for independently chosen random samples of male and female college students is given below. The data comes from a study done in the *Journal of College Student Development*. Does there appear to be a gender difference with respect to drinking behavior?

 **Gender**

|  |  |  |  |
| --- | --- | --- | --- |
| **Drinking level** | Male | Female | **Total** |
| None | 140 | 186 | **326** |
| Low | 478 | 661 | **1139** |
| Moderate | 300 | 173 | **473** |
| High | 63 | 16 | **79** |
| **Total** | **981** | **1036** | **2017** |

1. In the article “Television Viewing and Physical Fitness in Adults” (*Research Quarterly for Exercise and Sport* 1990) the author hoped to determine whether time spent watching TV is associated with cardiovascular fitness. Subjects were asked about their TV viewing time (per day, rounded to the nearest hour) and were classified as physically fit if they scored in the excellent or very good category on a step test. Using the data collected, is there an association between TV viewing and cardiovascular fitness. Use α = .01

 **Fitness**

|  |  |  |  |
| --- | --- | --- | --- |
| **TV viewing time** | Physically Fit | Not Physically Fit | **Total** |
| 0 | 35 | 147 | **182** |
| 1-2 | 101 | 629 | **730** |
| 3-4 | 28 | 222 | **250** |
| 5 or more | 4 | 34 | **38** |
| **Total** | **168** | **1032** | **1200** |

1. Do women have different patterns of work behavior than men? Each person in a random sample of 423 graduates of a business school in Canada were polled and classified by gender and workaholism type, resulting in the following data:

|  |  |
| --- | --- |
|  | Gender |
| Workaholism Types | Female | Male |
| Work Enthusiasts | 20 | 41 |
| Workaholics | 32 | 37 |
| Enthusiastic Workaholics | 34 | 46 |
| Unengaged Workers | 43 | 52 |
| Relaxed Workers | 24 | 27 |
| Disenchanted Workers | 37 | 30 |

Is there sufficient evidence to suggest an association between gender and workaholism type?

1. Each observation in a random sample of 100 bicycle accidents resulting in death was classified according to the day of the week on which the accident occurred. Data consistent with information given on the website [www.highwaysafety.com](http://www.highwaysafety.com) are given in the following table:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Day of the week** | Sun | Mon | Tue | Wed | Thu | Fri | Sat |
| **# of deaths** | 14 | 13 | 12 | 15 | 14 | 17 | 15 |

Based on these data, is it reasonable to conclude that the proportion of accidents is not the same for all days of the week? Use α = .05

1. Medical researchers enlisted 90 subjects for an experiment comparing treatments for depression. The subjects were randomly divided into three groups and given pills to take for a period of three months. Unknown to them, one group received a placebo, the second group the “natural” remedy St. John’s wort, and the third group the prescription drug Posrex. After six months, psychologists and physicians (who did not know which treatment each person had received) evaluated the subjects to see if their depression had returned. Is there evidence to suggest a difference in the recurrence rate of depression for the 3 treatments? The data are shown in the table below.



**Unit 10 Worksheet Answers**

1. H0: The proportion of students graduating from California colleges and universities for these ethnic group categories is the same as the respective proportions in the population of California.

Ha: The proportion of students graduating from California colleges and universities for these ethnic group categories is different from the respective proportions in the population of California.

Don’t forget to check conditions!

χ2 GOF Test w/ df = 4

χ2 = 303.09 pvalue = 2.34 x 10–64

B/c 2.34 x 10–64 < .01, we reject the null. There is evidence that the proportion of students graduating from California colleges and universities for these ethnic group categories is the different from the respective proportions in the population of California.

1. H0: There is not a gender difference with respect to drinking behavior.

Ha: There is a gender difference with respect to drinking behavior.

Don’t forget to check the conditions (including samples/groups independent b/c HOP)!

χ2 Homogeneity Test w/ df = 3

χ2 = 96.53 pvalue = 8.675 x 10–21

B/c 8.675 x 10–21 < .05, we reject the null. There is evidence of a gender difference with respect to drinking behavior.

1. H0: There is not an association between TV viewing and cardiovascular fitness.

Ha: There is an association between TV viewing and cardiovascular fitness.

Don’t forget to check the conditions!

χ2 Indpendence Test w/ df = 3

χ2 = 6.16 pvalue = .1040

B/c .1040 > .05, we fail to reject the null. There is not evidence of an association between TV viewing and cardiovascular fitness.

1. H0: There is not an association between gender and workaholism type.

Ha: There is an association between gender and workaholism type.

Don’t forget to check the conditions!

χ2 Independence Test w/ df = 5

χ2 = 6.85 pvalue = .2319

B/c .2319 > .05, we fail to reject the null. There is not evidence of an association between gender and workaholism type.

1. H0: The proportion of accidents is the same for all days of the week.

Ha: The proportion of accidents is not the same for all days of the week.

Don’t forget to check the conditions!

χ2 GOF Test w/ df = 6

χ2 = 1.08 pvalue = .9824

B/c .9824 > .05, we reject the null. There is not evidence that the proportion of accidents is not the same for all days of the week.

1. H0: There is not a difference in the recurrence rate of depression for the 3 treatments.

Ha: There is a difference in the recurrence rate of depression for the 3 treatments.

Don’t forget to check the conditions (Note: This one is an experiment!)

χ2 Homogeneity Test w/ df = 2

χ2 = 8.4 pvalue = .0150

B/c .0150 < .05, we reject the null. There is evidence of a difference in the recurrence rate of depression for the 3 treatments.