STAT 110A
Brani Vidakovic

Name:____

Quiz 8

Nightmares. Over the years numerous studies have sought to characterize the nightmare sufferer. Out of these has emerged the stereotype of someone with high anxiety, low ego strength, feeling of inadequacy, and poorer-than-average physical health. What is not so well known, though, is whether the sex is independent of having frequent nightmares. Using Hersen's[1] data test this independence at level $\alpha = 0.05$..

	Men	Women
Nightmares often	55	60
Nightmares seldom	105	132

[1]Hersen, M. (1971). Personality characteristics of nightmare sufferers. *Journal of Nervous and Mental Diseases, 153, 29-31.* Hersen looked at nightmare frequences for a sample of 160 men and 192 women. Each subject was asked whether he or she experienced nightmares *often* (at least once a month) or *seldom* (less than once in month)

Cell Counts. A student takes the blood cell count of five random blood samples from a larger volume of solution to determine if it is well mixed. She expects the cell counts to be distributed uniformly. The data is given below:

sample blood cell count	expected blood cell count
35	27.2
20	27.2
25	27.2
25	27.2
31	27.2
136	136

1. Can she depend on the results to be uniformly distributed? Do the chi-square test with $\alpha = 0.05$.

Not at all like me. You have a theory that if you ask subjects to sort one-sentence characteristics of people (e.g. "I eat to fast") into five piles ranging from *not at all like me* to *very much like me,* the percentage placed in each of five piles will be approximately 10, 20, 40, 20, and 10. You have one of your friends sort 50 statements, and you obtain the following data: 8, 9, 21, 8, and 4.

Do these data support your hypothesis?

[Sol. $\chi^2 = (5-8)^2/8+(10-9)^2/9+(20-21)^2/21+(10-8)^2/8+(5-4)^2/4 = 2.03373$. p-value $= 0.7296891$.]

Importance of bystanders. Darley and Latané (1968) asked subjects to participate in a discussion carried over an intercom. Aside from the experimenter to whom they were speaking, subjects thought that there were zero, one, or four other people (bystanders) also listening over intercom. Partway through the discussion, the experimenter feigned serious illness and ask for help. Darley and Latané noted how often the subject sought help for the experimenter as a function of the number of supposed bystanders. The data are give in the table:

	Sought Assistance	No Assistance
No bystanders	11	2
One bystander	16	10
Four bystanders	4	9

What could Darley and Latané conclude from the results?

- State H_0 and H_1.
- Perform the test. Use MINITAB.

[Sol. H_0: Assistance and the number of bystanders are independent.

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          C1        C2     Total
   1      11         2        13
        7.75      5.25

   2      16        10        26
       15.50     10.50

   3       4         9        13
        7.75      5.25

Total     31        21        52

ChiSq =  1.363 +  2.012 +
         0.016 +  0.024 +
         1.815 +  2.679 = 7.908
df = 2
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p-value $= 0.0192$.]

Stock Market

There are many "indicators" that investors use to predict the behavior of the stock market. One of these is the "January Indicator." Some investors believe that if the market is up in January, then it will be up for the rest of the year. On the other hand if it is down in January, then it will be down for the rest of the year. The following table gives data for 72 years from 1916 to 1987:

	Up Jan.	Down Jan.
Up Feb-Dec.	33	13
Down Feb-Dec.	13	13

1. Give the description of an appropriate null and alternative hypothesis.
2. Do the test of hypotheses from 1 at $\alpha = 0.01$ and state your decision.

Alcohol and Marriage. A national survey was conducted to obtain info on the alcohol consumption patterns of American adults by marital status. A random sample of 1772 residents 18 years old and over, yielded the data below. Do the data suggest at 5% significance level that marital status and alcohol consumption patterns are statistically dependent?

	Abstain	1 - 60	over 60
Single	67	213	74
Widowed	85	633	129
Divorced	27	60	15