AP Stat Inference Practice Worksheet #9 Name _____
Ch 14.1 & 14.2 Chi-Sq

Practice Problems. Follow your Chi-Square Template to answer each question.

These practice problems illustrate the three different Chi-squared tests. As you read each problem, think about how you can identify which test to use by the wording of the problem and the information given.

1. Jury Selection
One study of grand juries in Alameda County, California, compared the demographic characteristics of jurors with the general population, to see if jury panels were representative. The results for age are shown below. The investigators wanted to know if the 66 jurors were selected at random from the population of Alameda County. (Only persons over 21 and over are considered; the county age distribution is known from Public Health Department data.) The study was published in the UCLA Law Review.

Age	County-wide %	# of jurors observed	# of jurors expected	(O-E)	$(O-E)^2/E$
21-40	42%	5			
41-50	23%	9			
51-60	16%	19			
over 60	19%	33			
Total	100%	66			

Do we have evidence that grand juries are selected at random for the population of Alameda County?

2. Pre-school Attendance and Pre-algebra Achievement
In these times of educational reform, attention has been focused on pre-school for all children. Since many districts are facing budget cuts, funding pre-school programs may impact other offerings. Before making their recommendations, administrators in a large urban district take a random sample of 50 seventh graders and compare the pre-algebra achievement levels of those who attended pre-school and those who did not. If achievement is independent of attending pre-school then the proportions at each level should be equal. Use the counts in the frequency table to determine if there is an association between attending pre-school and pre-algebra achievement.

	Below grade level	At grade Level	Advanced
Pre-school	8	6	6
No Pre-school	6	15	9

3. Evaluating Textbooks
Does a new math program improve student performance? Suppose you take a random sample of 20 students who are using a new algebra text which features group work and unit summaries and a second sample of 30 students who are using a more traditional text. You compare student achievement on the state test given to all students at the end of the course. Use the frequency table to determine if the proportions from each group are equal at each performance level.

	Below grade level	At grade level	Advanced
New text	7	8	5
Old text	5	17	8

4. Stealing Cars
Does the color of a car influence the chance that it will be stolen? The Associated Press (*San Luis Obispo Telegram-Tribune, Sept. 2 1995*) reported the following information for a random sample of 830 stolen vehicles:

Color	White	Blue	Red	Black	Other
# stolen	140	100	270	230	90

Suppose it is known that 15% of all cars are white, 15% are blue, 35% are red, 30% are black, and 5% are other colors. Do we have evidence that the color of a car will influence whether it is stolen.

5. TV Channels
In a recent year, at the 6 pm time slot, TV channels 2, 3, 4, and 5 captured the entire audience with 30%, 25%, 20%, and 25%, respectively. During the first week of the nest season, 500 viewers are interviewed. The actual numbers observed were as follows:

	CHANNEL			
	2	3	4	5
Observed Number	139	138	112	111

Do these numbers indicate a change in viewer's preference?

6. Childhood Abuse
To determine whether men with a combination of childhood abuse and a certain abnormal gene are more likely to commit violent crimes, a study a conducted on a SRS of 575 males in the 25 to 35 age group. The data are summarized in the following table:

	Not Abused, Normal Gene	Abused, Normal Gene	Not Abused, Abnormal Gene	Abused, Abnormal Gene
Criminal Behavior	38	21	32	26
Normal Behavior	201	79	118	50

Do these data give statistical evidence that there is an association between being abuse and/or carrying an abnormal gene and the tendency toward criminal behavior? Use a 5% significance level.

7. Fruit Flies
A geneticist claims that four species of fruit flies should appear in the ratio 1:3:3:9. Suppose that a sample of 4000 flies contained 226, 764, 733, and 2277 flies of each species, respectively. At the 10% significance level is there evidence to reject the geneticist's claim?