

AP Stats Chapter 26 Problems

1. Given the data below, in conducting a test of association between gender and grade, what is the expected count for the number of males who earned a grade of B?

	A	B	C	D
Male	10	32	25	6
Female	5	41	14	12

- (A) 32.3
(B) 35.5
(C) 36.8
(D) 41.0
(E) It cannot be determined
5. Wheels, Inc. offers four major brands of tires to its customers. In order to determine whether the tires are equally preferred, 200 customers are randomly selected and offered each type of tire at the same price. Results show that 43 buy Brand A, 61 buy Brand B, 55 buy Brand C, and 41 buy Brand D. Is there sufficient evidence to conclude that the customers have preferences between the brands? Use alpha equal to 0.05.
- (A) No, since with chi-square equal to 0.98 there is not sufficient evidence at $\alpha = 0.05$.
(B) Yes, since with chi-square equal to 1.42 there is sufficient evidence at $\alpha = 0.05$.
(C) No, since with chi-square equal to 1.42 there is not sufficient evidence at $\alpha = 0.05$.
(D) Yes, since with chi-square equal to 5.52 there is sufficient evidence at $\alpha = 0.05$.
(E) No, since with chi-square equal to 5.52 there is not sufficient evidence at $\alpha = 0.05$.

35. At a certain high school a simple random sample was taken asking fifty-two 11th and 12th graders their political affiliation. The following two-way table was established. If a χ^2 test of independence were performed on these data, what would be the corresponding degrees of freedom?

	11th Grade	12th Grade
Republican	11	5
Democrat	10	15
Independent	5	6

- (A) 1
- (B) 2
- (C) 3
- (D) 6
- (E) 25

9. A survey was conducted among 340 high school girls in which they were polled regarding whether they were right-handed or left-handed and whether or not they played a musical instrument. The table below displays the results of the survey:

	Play	Does not play	Total
Right-handed	74	236	310
Left-handed	18	12	30
Total	92	248	340

If the likelihood of a girl playing an instrument is independent of left or right-handedness, what is the expected number in the cell representing right-handed girls who play a musical instrument?

- (A) 62
- (B) 74
- (C) 80.2
- (D) 83.9
- (E) 92.1

10. In a study to compare movie preferences among different age groups, a χ^2 statistic was used. If a small value of the test statistic is obtained, it suggests that
- (A) the null hypothesis may not be rejected, since the differences between the observed and expected values are relatively large
 - (B) the null hypothesis may be rejected, since the differences between the observed and expected values are relatively large
 - (C) the null hypothesis may be rejected, since the differences between the observed and expected values are relatively small
 - (D) the null hypothesis may not be rejected, since the differences between the observed and expected values are relatively small
 - (E) There is not enough information to answer this question
1. A random sample of 100 people was asked to state his or her gender and favorite ice cream flavor. The results appear in the table below.

	Vanilla	Chocolate	Strawberry
Male	10	24	12
Female	28	16	10

- A chi-square test is used to test the null hypothesis that gender and preferred ice cream flavor are independent. Which of the following statements is correct?
- (A) Do not reject H_0 at the 0.05 significance level.
 - (B) Do not reject H_0 at the 0.01 significance level.
 - (C) Reject H_0 at the 0.01 significance level.
 - (D) Reject H_0 at the 0.005 significance level.
 - (E) Reject H_0 at the 0.001 significance level.

24. A die was rolled 24 times with the following results:

Number of dots	1	2	3	4	5	6
Frequency	2	8	2	1	3	8

A goodness-of-fit chi-square test is to be used to test the null hypothesis that the die is fair. At a significance level of $\alpha = .01$, the value of chi-square and the decision reached is

- (A) 12.5; fail to reject the null hypothesis
- (B) 12.5; reject the null hypothesis
- (C) 25.0; fail to reject the null hypothesis
- (D) 25.0; reject the null hypothesis
- (E) 75.5; reject the null hypothesis

A certain type of electronic component is made in three different factories. Samples were taken from each to see how many were defective. The contingency table below shows the results.

	Satisfactory	Defective
Factory A	90	10
Factory B	67	3
Factory C	70	10

Carry out a hypothesis test at the 5% level and decide whether the quality of the component is independent of the factory where it is made.

Write down H_0 and H_1 .

Add row and column totals to the table.

	Satisfactory	Defective	Total
Factory A	90	10	
Factory B	67	3	
Factory C	70	10	
Total			

Draw up a new table with expected frequencies.

	Satisfactory	Defective	Total
Factory A			
Factory B			
Factory C			
Total			

Work out the χ^2 statistic.

Work out the number of degrees of freedom.

Look up the critical value.

Make your conclusion.

- 3) A study is being conducted to determine whether or not there is a relationship between jogging and blood pressure. A random sample of 210 subjects is selected and they are classified as in the table below. At $\alpha = 0.05$, test the claim that jogging and blood pressure are independent of each other.

Jogging status	Low BP	Moderate BP	High BP
Joggers	34	57	21
Non joggers	15	63	20

2. A member of an emergency medical service wishes to determine whether the number of accidents is equally distributed during the week. A week was selected at random and the following data were obtained. Is there evidence to reject the hypothesis that the number of accidents is equally distributed throughout the week at $\alpha = 0.05$?

Day	Mon	Tues	Wed	Thu	Fri	Sat	Sun
No. of accidents	28	32	20	21	36	43	23

3. According to recent census report, 68% of families have two parents, 23% have only a mother present, 5% have only a father present and 4% have no parent present. A random sample of families from a large school district revealed these results:

Two parents	Mother only	Father only	No Parent
120	40	30	10

Is there sufficient evidence ($\alpha = 0.05$) to conclude that the proportions of families by type of parent(s) differ from those reported by the census?

4) Is the type of pet owned dependent on annual household income? Use this SRS of Americans.

Income (\$)	Dog	Cat	Bird	Fish
Under 12,500	127	139	173	95
12,500-24,999	191	197	209	203
25,000-39,999	216	215	220	218
40,000-59,999	215	212	175	231
\$60,000 and over	254	237	223	254

Use the TI-84 to solve. State the Hypotheses and conclusion.