

Contingency Tables Questions

Use a  $\chi^2$  test to test the claim that in the given contingency table, the row variable and the column variable are independent.

- 1) Tests for adverse reactions to a new drug yielded the results given in the table. At the 0.05 significance level, test the claim that the treatment (drug or placebo) is independent of the reaction (whether or not headaches were experienced). 1) \_\_\_\_\_

	Drug	Placebo
Headaches	11	7
No headaches	73	91

- 2) The table below shows the age and favorite type of music of 668 randomly selected people. 2) \_\_\_\_\_

	Rock	Pop	Classical
15-25	50	85	73
25-35	68	91	60
35-45	90	74	77

Use a 5 percent level of significance to test the null hypothesis that age and preferred music type are independent.

- 3) 160 students who were majoring in either math or English were asked a test question, and the researcher recorded whether they answered the question correctly. The sample results are given below. At the 0.10 significance level, test the claim that response and major are independent. 3) \_\_\_\_\_

	Correct	Incorrect
Math	27	53
English	43	37

- 4) Responses to a survey question are broken down according to employment status and the sample results are given below. At the 0.10 significance level, test the claim that response and employment status are independent. 4) \_\_\_\_\_

	Yes	No	Undecided
Employed	30	15	5
Unemployed	20	25	10

## Answer Key

### Testname: CONTINGENCY\_TABLES

1)  $H_0$ : Treatment and reaction are independent.

$H_1$ : Treatment and reaction are dependent.

Test statistic:  $\chi^2 = 1.798$ . Critical value:  $\chi^2 = 3.841$ .

Fail to reject the null hypothesis. There is not sufficient evidence to warrant rejection of the claim that treatment and reaction are independent.

2)  $H_0$ : Age and preferred music type are independent.

$H_1$ : Age and preferred music type are dependent.

Test statistic:  $\chi^2 = 12.954$ . Critical value:  $\chi^2 = 9.488$ .

Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that age and preferred music type are independent.

3)  $H_0$ : Major and response are independent.

$H_1$ : Major and response are dependent.

Test statistic:  $\chi^2 = 6.502$ . Critical value:  $\chi^2 = 2.706$ .

Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that response and major are independent.

4)  $H_0$ : Employment status and response are independent.

$H_1$ : Employment status and response are dependent.

Test statistic:  $\chi^2 = 5.942$ . Critical value:  $\chi^2 = 4.605$ .

Reject the null hypothesis. There is sufficient evidence to warrant rejection of the claim that response and employment status are independent.