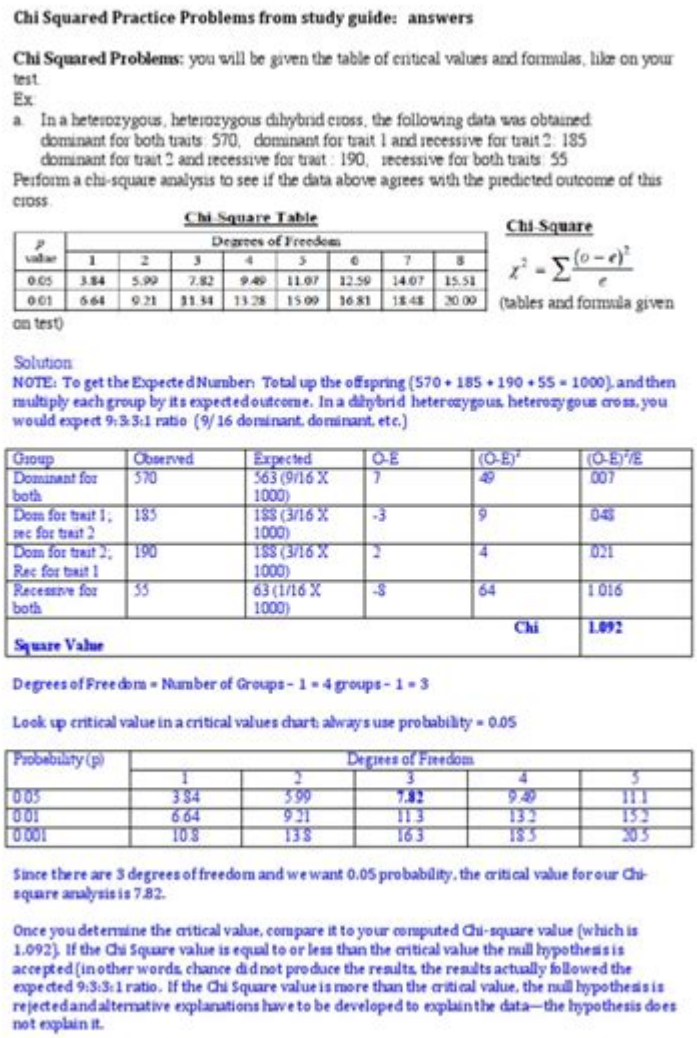
Chi Square Worksheet With Answers



Chi Squared Practice Problems from study guide: answers

1. **Chi Squared Problems:** you will be given the table of critical values and formulas, like on your test.
   Ex:
   a. In a heterozygous, heterozygous dihybrid cross, the following data was obtained:
      dominant for both traits: 570; dominant for trait 1 and recessive for trait 2: 185
      dominant for trait 2 and recessive for trait 1: 190; recessive for both traits: 55
   Perform a chi-square analysis to see if the data above agrees with the predicted outcome of this cross.

Chi-Square Table

p value	Degrees of Freedom							
	1	2	3	4	5	6	7	8
0.05	3.84	5.99	7.82	9.49	11.07	12.59	14.07	15.51
0.01	6.64	9.21	11.34	13.28	15.09	16.81	18.48	20.09

Chi-Square

$$\chi^2 = \sum \frac{(o-e)^2}{e}$$

(tables and formula given on test)

Solution:

NOTE: To get the Expected Number: Total up the offspring (570 + 185 + 190 + 55 = 1000), and then multiply each group by its expected outcome. In a dihybrid heterozygous, heterozygous cross, you would expect 9:3:3:1 ratio (9/16 dominant, dominant, etc.)

Group	Observed	Expected	O-E	$(O-E)^2$	$(O-E)^2/E$
Dominant for both	570	563 (9/16 X 1000)	7	49	.007
Dom for trait 1, rec for trait 2	185	188 (3/16 X 1000)	-3	9	.048
Dom for trait 2, Rec for trait 1	190	188 (3/16 X 1000)	2	4	.021
Recessive for both	55	63 (1/16 X 1000)	-8	64	1.016
Square Value				**Chi**	**1.092**

Degrees of Freedom = Number of Groups - 1 = 4 groups - 1 = 3

Look up critical value in a critical values chart; always use probability = 0.05

Probability (p)	Degrees of Freedom				
	1	2	3	4	5
0.05	3.84	5.99	**7.82**	9.49	11.1
0.01	6.64	9.21	11.3	13.2	15.2
0.001	10.8	13.8	16.3	18.5	20.5

Since there are 3 degrees of freedom and we want 0.05 probability, the critical value for our Chi-square analysis is 7.82.

Once you determine the critical value, compare it to your computed Chi-square value (which is 1.092). If the Chi Square value is equal to or less than the critical value the null hypothesis is accepted (in other words, chance did not produce the results, the results actually followed the expected 9:3:3:1 ratio. If the Chi Square value is more than the critical value, the null hypothesis is rejected and alternative explanations have to be developed to explain the data—the hypothesis does not explain it.

Chi square worksheet with answers is a valuable resource for students and professionals alike, especially in the fields of statistics, biology, and social sciences. Understanding how to conduct a chi-square test and interpret the results is crucial for data analysis. This article will provide a comprehensive overview of chi-square tests, how to complete a chi-square worksheet, and offer detailed answers to example problems, thereby solidifying your grasp of this essential statistical tool.

What is the Chi-Square Test?

The chi-square test is a statistical method used to determine whether there is a significant association between categorical variables. It compares the observed frequencies in each category of a contingency table to the frequencies we would expect under the null hypothesis, which states that no association exists between the variables.

Types of Chi-Square Tests

There are two main types of chi-square tests:

- **Chi-Square Test of Independence:** This test assesses whether two categorical variables are independent of one another.
- **Chi-Square Goodness of Fit Test:** This test determines whether a sample distribution matches an expected distribution.

The Chi-Square Formula

The formula for calculating the chi-square statistic (x^2) is:

- $x^2 = \Sigma ((O - E)^2 / E)$

Where:
- O = Observed frequency
- E = Expected frequency

Steps to Complete a Chi-Square Worksheet

To effectively use a chi-square worksheet, you need to follow these steps:

1. **State the Hypotheses:** Formulate the null hypothesis (H0) and the alternative hypothesis (H1).
2. **Collect Data:** Gather the observed frequencies for each category.
3. **Calculate Expected Frequencies:** Use the total counts to compute the expected frequencies for each category.
4. **Compute the Chi-Square Statistic:** Apply the chi-square formula to calculate the statistic.
5. **Determine Degrees of Freedom:** Calculate the degrees of freedom using the formula (df = (rows - 1) (columns - 1)).
6. **Find the Critical Value:** Use a chi-square distribution table to find the critical value based on your chosen significance level (commonly a = 0.05) and degrees of freedom.
7. **Make a Decision:** Compare the calculated chi-square statistic to the critical value to accept or reject the null hypothesis.

Example Chi-Square Worksheet Problem

Let's work through an example to illustrate how to fill out a chi-square worksheet.

Scenario

A researcher wants to determine if there is a relationship between gender (male, female) and preference for a type of snack (chips, candy). The observed data collected is as follows:

Gender	Chips	Candy	Total
Male	30	10	40
Female	20	40	60
Total	50	50	100

Step-by-Step Solution

1. State the Hypotheses:
- H0: Gender and snack preference are independent.
- H1: Gender and snack preference are not independent.

2. Collect Data:
- Observed frequencies (O) are already provided in the table.

3. Calculate Expected Frequencies:

For each cell in the table, the expected frequency (E) can be calculated using the formula:
$$
E = \frac{(\text{Row Total}) \times (\text{Column Total})}{\text{Overall Total}}
$$

- For Males (Chips): E = (40 50) / 100 = 20
- For Males (Candy): E = (40 50) / 100 = 20
- For Females (Chips): E = (60 50) / 100 = 30
- For Females (Candy): E = (60 50) / 100 = 30

The expected frequency table will look like this:

Gender	Chips	Candy	Total
Male	20	20	40
Female	30	30	60
Total	50	50	100

4. Compute the Chi-Square Statistic:

Using the chi-square formula, we calculate:
$$
\chi^2 = \sum \frac{(O - E)^2}{E}
$$

- For Males (Chips): $x^2 = (30 - 20)^2 / 20 = 5$
- For Males (Candy): $x^2 = (10 - 20)^2 / 20 = 5$
- For Females (Chips): $x^2 = (20 - 30)^2 / 30 = 3.33$

- For Females (Candy): $x^2 = (40 - 30)^2 / 30 = 3.33$

Total $x^2 = 5 + 5 + 3.33 + 3.33 = 16.66$

5. Determine Degrees of Freedom:
$$
df = (rows - 1) \times (columns - 1) = (2 - 1) \times (2 - 1) = 1
$$

6. Find the Critical Value:
Using a chi-square table at $a = 0.05$ and $df = 1$, the critical value is approximately 3.841.

7. Make a Decision:
Since $16.66 > 3.841$, we reject the null hypothesis.

Conclusion

The analysis indicates a significant relationship between gender and snack preference. Understanding how to properly complete a **chi square worksheet with answers** is essential for anyone involved in statistical analysis. By following the steps outlined above and practicing with various datasets, you can enhance your proficiency in applying the chi-square test, making it easier to interpret and present your findings effectively.

Utilizing chi-square worksheets not only helps in organizing your data but also serves as a practical tool to reinforce your understanding of statistical concepts. Whether you are a student or a professional, mastering the chi-square test is invaluable in data-driven decision-making.

Frequently Asked Questions

What is a chi-square worksheet used for?

A chi-square worksheet is used to organize and perform calculations for chi-square tests, which assess the association between categorical variables.

How do I set up a chi-square worksheet?

To set up a chi-square worksheet, create a table to display observed frequencies, expected frequencies, and calculate the chi-square statistic using the formula: $x^2 = \Sigma((O - E)^2 / E)$, where O is the observed frequency and E is the expected frequency.

What kind of data is suitable for a chi-square test?

Chi-square tests are suitable for categorical data, including nominal and ordinal variables, where you can count and compare frequencies.

What is the null hypothesis in a chi-square test?

The null hypothesis in a chi-square test states that there is no association between the categorical variables being analyzed.

How do I interpret the results from a chi-square worksheet?

To interpret the results, compare the calculated chi-square statistic to the critical value from the chi-square distribution table based on the degrees of freedom and significance level. If the statistic exceeds the critical value, reject the null hypothesis.

What is the significance level commonly used in chi-square tests?

The common significance level used in chi-square tests is 0.05, which indicates a 5% risk of concluding that an association exists when there is none.

What are the degrees of freedom in a chi-square test?

Degrees of freedom in a chi-square test are calculated as (number of rows - 1) (number of columns - 1) in a contingency table.

Can I use a chi-square test for small sample sizes?

Chi-square tests are not recommended for small sample sizes. If any expected frequency is less than 5, consider using Fisher's exact test instead.

What is the difference between chi-square goodness-of-fit and chi-square test of independence?

The chi-square goodness-of-fit test checks if an observed frequency distribution matches an expected distribution, while the chi-square test of independence assesses whether two categorical variables are independent of each other.

Where can I find chi-square worksheets with answers?

Chi-square worksheets with answers can be found on educational websites, statistical textbooks, and online resources that provide statistics exercises and solutions.

Chi Square Worksheet With Answers

Bing Homepage Quiz: Test Your Knowledge Now! - On4t ...
Feb 16, 2024 · When you take this quiz, it checks your knowledge on various subjects based on the daily images ...

Bing Homepage Quiz: Play Daily and Test Your Knowledge
Launched in 2016, this daily online quiz by Bing has inspired millions to explore the world, one question at a time. ...

Bing Quiz: Fun and Engaging Questions for All Ages
4 days ago · The quiz covers categories like sports, geography, literature, technology, and more. This diversity ...

Bing Homepage Quiz - Play Bing Quiz Today
To access the quiz, visit the Bing homepage and click on the interactive area within or near the daily image. ...

How to play the Bing Trends Quiz? - Trybotics
Start the Bing quiz by clicking on the banner that says 'Trends Quiz' on the Bing homepage. You will be asked a ...

格安航空券 | 飛行機 予約 | 最低価格保証 | ジェットスター - *Jetstar*
ジェットスターは日本国内、アジア太平洋地域に就航するLCCです。公式サイトでは、毎日お手頃な価格の航空券を予約・購入できるほか、おトクなセール情報もご提供しています。事前のオンラインチェックインが便利です。

ジェットスター・ジャパン - *Wikipedia*
ジェットスター・ジャパン ... 出発間近の機内（JA03JJ）ジェットスター・ジャパン株式会社 (Jetstar Japan Co., Ltd) は、千葉県 成田市 の 成田国際空港 内に本社 を置き、成田国際空港を拠点とする、日本航空 (JAL) グループの 格安航空会社 (LCC) [3] である。

ジェットスター航空 **(Jetstar)**の飛行機・格安航空券予約なら **...**
ジェットスター航空 (Jetstar)の国内線格安航空券を予約するならスカイチケット。札幌 (新千歳) 東京 (成田) 那覇空港行きなどジェットスター航空 (Jetstar)国内の主要路線からすべての路線を網羅、往復・片道最安値運賃を一括検索! 手荷物情報も確認可能。

ジェットスター（**Jetstar** ）国内線ツアー｜ジェットスターツアーズ
沖縄・北海道・成田・福岡・大阪など多彩な宿泊プランと航空券のパックツアーはジェットスターツアーズにお任せください♪

ジェットスター航空*(Jetstar Airways)*の格安航空券・予約【*HIS*】
ジェットスター航空 (Jetstar Airways)の格安航空券を予約するなら【HIS】。各航空会社の激安航空券から航空会社情報、機内サービス、評判・口コミなどをご紹介しております。

ジェットスター（**Jetstar**）の国内格安航空券・飛行機予約｜トラ **...**
ジェットスター（Jetstar）の格安航空券・飛行機を予約するなら【トラベリスト】。東京発→福岡行き、福岡発→東京行きなど、最安値を簡単検索。

【**2025**年**7**月】ジェットスターのセールはいつ? 国内線・国際線 **...**
Jun 26, 2025 · ジェットスターと同じくLCCのピーチ。ピーチも定期的にセールを開催しています。【2025年7月】ピーチ（Peach）の次回セールはいつ? 国内・国際線最新情報まとめ この記事では、ピーチの国内線、国際線の航空券のセール情報を旅のプロが解説します。

公式｜**LCC**｜国内線・国際線｜航空券 | ジェットスター **- Jetstar**
航空会社の安全度ランキング*で2021年から4年連続で「最も安全なLCC20社」に選ばれました。ジェットスターでは、Safety Management System（安全管理システム）の積極的活用により、運航業務全般にわたって細心の注意を払い、一つひとつ手順を確認しています。

ジェットスターの時刻表と就航路線一覧! 発着時間と基本運賃 ...
Jul 4, 2023 · ジェットスター・ジャパンはオーストラリアのカンタス航空を母体に持つ、日本のLCC（格安航空会社）です。成田、中部、関西の3つの主要空港と、国内の13の空港、国外4つの空港 を結んでいます。

【*2025*年*7*月】国内線タイムセール情報（*JAL／ANA／Jetstar ...*
タイムセール期間: 2025年7月29日（火）0:00~23:59 主なラインナップ: 過去の企画ラインナップ: （2025年6月）お盆期間が対象! ANA SUPER VALUEセール（2025年2月）ANA SUPER VALUE セール（便限定）、国内線特典航空券減額マイルキャンペーン（2024年12月）減額マイルでおトクに春の国内旅行へ! 1月 ...

Unlock your understanding of statistics with our chi square worksheet with answers. Perfect for students and educators! Learn more and master this essential concept today.

Back to Home