

QM213 Week 14 Review Questions

1. Someone knows what a theoretical frequency distribution is supposed to be and wants to know if the observed data conform to expectation. What kind of test should be used? How should the results be interpreted?
2. Someone wants to compare the observed frequency distributions for a number of categories in a number of samples. What kind of test should be used? How should the results be interpreted?
3. Some floatball players are interested in seeing whether the teams differ in the numbers of different types of play that they used this last season (considered their sample) compared with the global statistics for the last 100 years (considered the parametric data). Which of the following statistical methods should they be using to answer their question?
4. In a test for equality of the frequency distributions of votes cast in the 2346 election for each of five political parties in five colonies, a statistician finds that the chi-square statistic for independence has a $P(H_0)$ of 0.002. What is the probability that there is no association between colony and votes for the parties?
5. Galaxyfleet exobiologists are examining the observed frequencies of the six reproductive types of grotworms on Annubis IV and comparing them to the theoretical frequencies predicted by chromosomal analysis. In finishing their analysis of the goodness-of-fit between the sample and the theory, which statistical function of Excel 2212 (identical to those of Excel 2207 and Excel 2210) should they use to compute the probability of the null hypothesis?
6. A team of economists is looking at the top economic priorities of a large sample of people classified into the quintiles of the income distribution to see if there are any differences. The economists count how many people in each quintile in their sample choose which of four key concerns as their top priority. How many degrees of freedom are there for their test of the null hypothesis?
7. A team of economists is looking at the top economic priorities of a large sample of people classified into the 10 deciles of the income distribution to see if there are any differences. The economists count how many people in each decile in their sample choose which of 10 key concerns as their top priority. Which of the following statistics should the economists be using to test their null hypothesis?
8. A recruiter is studying the responses (positive, neutral, negative) to five different recruitment campaigns for Galaxyfleet. The null hypothesis is that there are no differences in the relative numbers of reactions to the campaigns. What is the statistic that is generated and tested in this analysis?
9. In a test for equality of the frequency distributions of votes cast in the 2332 election for each of six political parties in six colonies, a statistician finds that the chi-square statistic for independence has a $P(H_0)$ of 0.721. At the 0.05 level of significance, what can the statistician conclude from this analysis?
10. Which of the following EXCEL functions does one use to compute the actual value of the chi-square statistic (X^2) for a goodness-of-fit test with 15 rows given the probability of the H_0 ?
11. A researcher is studying the responses to questions about likelihood of buying new kitchen equipment (stove, refrigerator, compacter) in a survey of people from 32 different cities. The null hypothesis is that there are no differences in the relative numbers of people intending to buy types of equipment in the different cities. What is the name of this kind of analysis?
12. The complete frequency distribution of the numbers of votes cast in the 2084 election for each of four political parties on Ganymede Colony is known from historical records. Political scientists want to know if there are grounds for describing the distribution of votes cast in the 2090 election for those same parties as different from those of 2086. What statistical procedure should the political scientists use to test the hypothesis that a sample of observed votes in the current election matches the distribution of votes based on the results from 2086?

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13. A team of economists is looking at of a large sample of people if there is a relationship between how much money they earn and how much money they give to non-profit charities. Which of the following statistical tests should they be using?
14. In a test for equality of the frequency distributions of defective and acceptable plascrete blocks from each of six suppliers, a statistician finds that the chi-square statistic for independence has a $P(H_0)$ of 0.0315. How should the statistician express her conclusions for this analysis?
15. The sum of the observed frequencies of the 7 types of antigravity drive models in a random sample of Galaxyfleet transports is 352. What is the sum of the predicted frequencies in the goodness-of-fit analysis looking at whether the antigravity drive models actually in use conform to the theoretical distribution based on the accounting records?
16. A marketing analyst is looking at the possibility that the proportions of people who buy Flash, Bang, Boom and Spurt antigravity flyers in samples from twelve different domed colonies differ; if that's true, it may be necessary to delve into the situation in more depth to adapt the marketing strategies to each colony according to what people are preferring to fly. What kind of analysis is suitable for the preliminary study to establish whether there are any differences among the flyer preferences in the different colonies?
17. A researcher is studying the purchasing preferences for five different brands of neural-interface polish of people from eight different professions. The null hypothesis is that there are no differences in the relative numbers of people preferring different neural-interface polish brands in the different professions. What is the name of the test likely being used in this analysis based on your studies in QM213?
18. In a test for equality of the frequency distributions of votes cast in the 2332 election for each of three political parties in six colonies, a statistician finds that the chi-square statistic for independence has a $P(H_0)$ of 0.0386. At the 0.01 level of significance, what can the statistician conclude from this analysis?
19. A marketing analyst is looking at the possibility that the proportions of people who buy Eight-Down Lemon Soda, Ekoc Soda, Dr Salt and Flatland Elixir in random samples from seven different cities differ; if that's true, it may be necessary to delve into the situation in more depth to adapt the marketing strategies to each city according to what people are preferring. What kind of analysis is suitable for the preliminary study to establish whether there are any differences among the soda preferences in the different cities?
20. A researcher is studying the purchasing preferences for four different brands of dietary supplements of people from five different income levels. The null hypothesis is that there are no differences in the relative numbers of people preferring different supplements in the different income levels. The researcher finds that the $P(H_0)$ is 0.00000374. What is a reasonable conclusion from this analysis?
21. In order to determine whether a particular medication was effective in curing the common cold, one group of patients was given the medication, while another group received sugar pills. The results of the study consist of the number of people feeling better and the number of people not feeling better after 2, 3, 2 and 6 days in each of the two groups. We are interested in determining whether or not the frequency distributions differ in the control group vs the treated group. What kind of statistical test should we use?

