

QM213 Review Questions Week 9: Hypothesis Testing I

1. A statistician is testing the null hypothesis that the major choice at Galaxyfleet academy (astrogation, navigation, weapons, engineering, security) is related to the planet of origin of the students (Earth, Mars, Vulcan, Romulus, Klingon, etc.). The test statistic produces a $P(H_0)$ equals 0.0058. Using the 0.001 level of statistical significance, should the statistician accept H_0 or reject H_0 ?
2. Which of the following statistical tests should be used to test the hypothesis that the parametric annual mean rates of return (e.g., 3.4%, 7.2%) based on samples from six different investments could be the same?
3. In hypothesis testing, the tentative assumption about the population parameter whose probability will be computed is called the ___?
4. You are trying to determine whether the mean speed of the RAM chips you use in fabrication of graphics cards at your factory from four different vendors come from populations with different parametric speeds. What is your null hypothesis?
5. A marketing executive is analyzing the results of the company's newest marketing campaign in seven different regions of the US (NE, SE, etc.). She wants to know if the campaign is having different results in different parts of the country. What is her null hypothesis?
6. You are trying to determine whether the mean speed of the RAM chips you use in fabrication of graphics cards at your factory from four different vendors come from populations with different parametric speeds. What is your alternative hypothesis?
7. A marketing executive is analyzing the results of the company's newest marketing campaign in seven different regions of the US (NE, SE, etc.). She wants to know if the campaign is having different results in different parts of the country. What is her alternative hypothesis?
8. A marketing manager is interested in finding out if there are statistical grounds for thinking that the new advertising campaign is increasing sales. Which of the following pairs of hypotheses is appropriate for this analysis?
9. A statistician is testing the null hypothesis that the major choice at Galaxyfleet academy (astrogation, navigation, weapons, engineering, security) is related to the planet of origin of the students (Earth, Mars, Vulcan, Romulus, Klingon, etc.). The test statistic produces a $P(H_0)$ equal to 0.0058. Using the conventional markers for significance, how should the statistician mark this result?
10. A researcher is examining several hundred financial reports submitted to the Securities and Exchange Commission (SEC) from publicly-traded corporations and analyzing the number of challenges issued by the SEC for accounting errors. The data are divided into five groups corresponding to four major accounting firms and "other." The researcher performs an ANOVA and calculates the F-test, finding that it has a $P(H_0)$ of 0.274. What is the meaning of this ANOVA in plain English?
11. A statistician is testing the null hypothesis that the major choice at Galaxyfleet academy (astrogation, navigation, weapons, engineering, security) is related to the planet of origin of the students (Earth, Mars, Vulcan, Romulus, Klingon, etc.). The H_0 is that there are no differences in choice of major and planet of origin. The test statistic produces a $P(H_0)$ equals 0.0058. Using the 0.01 level of statistical significance, how should the statistician decide about H_0 ?
12. A production-control officer in a factory wants to be confident that the rate of production of defective units is less than 0.01%. Which of the following sets of hypotheses is appropriate?
13. For a lower tail test, the p-value is the probability of obtaining a value for the test statistic by chance alone ___?
14. The p-value measures the statistical support for the ___?
15. The p-value in a statistical hypothesis test ___?
16. An F-test for H_0 as equality of two sample variances gives a value of 13.4 and has a $P(H_0)$ of 0.00004. Therefore, using the 0.001 level of statistical significance, we can conclude that the results ___?

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17. In hypothesis testing, when the null hypothesis is rejected, ___?
18. In hypothesis testing if the null hypothesis is accepted, ___?
19. A teacher compares the average final examination scores of two classes (2129 and 2130) at Galaxyfleet Academy using random samples from each graduating year. The null hypothesis is equality of the parametric mean scores. Using a t-test with 148 degrees of freedom to see if the mean scores differ, the t-test results in a probability value (p) of 0.003 for the null hypothesis. How can the teacher legitimately phrase the results of this test?
20. Which theoretical statistical distribution is used in testing for equality of parametric variances based on two sample variances?
21. The level of significance in hypothesis testing is the probability of ___?
22. The three levels of statistical significance generally in use are ___?
23. A statistician finds that the $P(H_0)$ is 0.03. What is the likelihood of being wrong in rejecting H_0 ?
24. When the p -value is used for hypothesis testing and α is the critical probability for the test, the null hypothesis is rejected if ___?
25. Which of the following does NOT need to be known in order to compute the p -value for the null hypothesis in a statistical test (or choose _all of the other choices must be known_)?
26. In the hypothesis testing procedure, α is called the ___?
27. Rejecting a null hypothesis if it is TRUE is ___?
28. Accepting a null hypothesis if it is FALSE is ___?
29. In hypothesis testing if the null hypothesis has been rejected when the alternative hypothesis is actually true, ___?
30. If a null hypothesis is rejected at the 5% level of significance, it ___?
31. If a null hypothesis is accepted at the 5% level of significance, it ___?
32. Your investment executive claims that the average parametric yearly rate of return RR on the stocks she recommends is more than 10.0%. You plan on taking a sample to test her claim. The correct set of hypotheses is ___?
33. A weatherman stated that the average temperature (μ) during July in Chattanooga is less than 80 degrees. A sample of 32 years of July records is taken. The correct set of hypotheses is ___?
34. The school's newspaper reported that the proportion P of students majoring in business is more than 30%. You plan on taking a sample to test the newspaper's claim. The correct set of hypotheses is ___?
35. In the past, 75% of the tourists who visited Chattanooga went to see Rock City. The management of Rock City recently undertook an extensive promotional campaign. They are interested in determining whether the promotional campaign actually increased the proportion (P) of tourists visiting Rock City. The correct set of hypotheses is ___?
36. For a one-tailed hypothesis test (upper tail) the p -value is computed to be 0.034. If the test is being conducted using the 5% confidence level, the null hypothesis ___?
37. We need to test the hypothesis that the parametric variance based on a sample could be the same as a defined variance for the population. Which of the following statistical tests can be used to answer the question?
38. We need to test the hypothesis that the parametric variances of two populations are equal to each other. If we calculate the variances of two random samples (one from each population), which of the following statistical tests can be used to answer the question?
39. A researcher is worried that the variances of responses in samples from two different areas of the country may not be the same. The convention at the researcher's institute is to use a significance level of 0.05. The statistical test has a value that is significant at the 0.01 level. These results mean that the researcher can reasonably accept that ___?