

Exam 4 Practice Test - PART II

SHORT ANSWER. Write the word or phrase that best completes each statement or answers the question.

For each problem, find:

1. Null, Alternate Hypothesis, type of test & level of significance
2. Check the conditions.
3. Compute the sample test statistic, draw a picture and find the P-value.
4. State the conclusion about the Null Hypothesis.
5. Interpret the conclusion.

1) An article in a journal reports that 34% of American fathers take no responsibility for child care. A researcher claims that the figure is higher for fathers in the town of Littleton. A random sample of 234 fathers from Littleton yielded 96 who did not help with child care. Test the researcher's claim at the 0.05 significance level. 1) _____

2) In a sample of 88 adults selected randomly from one town, it is found that 6 of them have been exposed to a particular strain of the flu. At the 0.01 significance level, do the data provide sufficient evidence to conclude that the percentage of all adults in the town that have been exposed to this strain of the flu differs from the nationwide percentage of 8%? 2) _____

3) In a sample of 165 children selected randomly from one town, it is found that 30 of them suffer from asthma. At the 0.05 significance level, do the data provide sufficient evidence to conclude that the percentage of all children in the town who suffer from asthma is different from 11%? 3) _____

4) Last year, the mean running time for a certain type of flashlight battery was 8.5 hours. This year, the manufacturer has introduced a change in the production method which he hopes will increase the mean running time. A random sample of 40 of the new light bulbs was obtained and the mean running time was found to be 8.7 hours. Do the data provide sufficient evidence to conclude that the mean running time, μ , of the new light bulbs is larger than last year's mean of 8.5 hours? Perform the appropriate hypothesis test using a significance level of 5%. Assume that $\sigma = 0.5$ hours. 4) _____

5) In 2000, the average duration of long-distance telephone calls originating in one town was 9.4 minutes. A long-distance telephone company wants to perform a hypothesis test to determine whether the average duration of long-distance phone calls has changed from the 2000 mean of 9.4 minutes. They randomly sampled 50 calls originating in the town and found that the mean duration of these 50 calls was 8.6 minutes. Do the data provide sufficient evidence to conclude that the mean call duration, μ , has changed from the 2000 mean of 9.4 minutes? Perform the appropriate hypothesis test using a significance level of 1%. Assume that $\sigma = 4.8$ minutes.

5) _____

6) A manufacturer claims that the mean amount of juice in its 16-ounce bottles is 16.1 ounces. A consumer advocacy group wants to perform a hypothesis test to determine whether the mean amount is actually less than this. The mean volume of juice for a random sample of 70 bottles was 15.94 ounces. Do the data provide sufficient evidence to conclude that the mean amount of juice for the 16-ounce bottles, μ , is less than 16.1 ounces? Perform the appropriate hypothesis test using a significance level of 10%. Assume that $\sigma = 0.9$ ounces.

6) _____

7) A large software company gives job applicants a test of programming ability and the mean for that test has been 160 in the past. Twenty-five job applicants are randomly selected from one large university and they produce a mean score and standard deviation of 183 and 12, respectively. Use a 0.05 level of significance to test the claim that this sample comes from a population with a mean score greater than 160. Use the P-value method of testing hypotheses. Assume normal distribution.

7) _____

8) A cereal company claims that the mean weight of the cereal in its packets is 14 oz. The weights (in ounces) of the cereal in a random sample of 8 of its cereal packets are listed below. Assume normal distribution

8) _____

14.6 13.8 14.1 13.7 14.0 14.4 13.6 14.2

Test the claim at the 0.01 significance level.

- 9) A light-bulb manufacturer advertises that the average life for its light bulbs is 900 hours. 9) _____
A random sample of 15 of its light bulbs resulted in the following lives in hours.
995 590 510 539 739 917 571 555
916 728 664 693 708 887 849
At the 10% significance level, test the claim that the sample is from a population with a mean life of 900 hours. Use the P-value method of testing hypotheses. Assume normal distribution.

Answer Key

Testname: EXAM 4 PRACTICE TEST PART II

- 1) $H_0: p = 0.34$. $H_1: p > 0.34$. Test statistic: $z = 2.27$. P-value: $p = 0.0116$.
Critical value: $z = 1.645$. Reject null hypothesis. There is sufficient evidence to support the researcher's claim that the proportion for fathers in Littleton is higher than 34%.
- 2) $H_0: p = 0.08$, $H_a: p \neq 0.08$.
 $\alpha = 0.01$
Test statistic: $z = -0.41$. P-value = 0.6818
Do not reject null hypothesis. At the 0.01 significance level, the data do not provide sufficient evidence to conclude that the percentage of all adults in the town that have been exposed to this strain of the flu differs from the nationwide percentage of 8%.
- 3) $H_0: p = 0.11$, $H_a: p \neq 0.11$.
 $\alpha = 0.05$
Test statistic: $z = 2.95$. P-value = 0.0032
Reject the null hypothesis. At the 0.05 significance level, the data provide sufficient evidence to conclude that the percentage of all children in the town who suffer from asthma is different from 11%.
- 4) $H_0: \mu = 8.5$ hours
 $H_a: \mu > 8.5$ hours
 $\alpha = 0.05$
 $z = 2.53$
P-value = 0.0057
Since $0.0057 < 0.05$, reject H_0 .
At the 5% significance level, the data provide sufficient evidence to conclude that the mean running time, μ , of the new light bulbs is larger than last year's mean of 8.5 hours. The evidence against the null hypothesis is very strong.
- 5) $H_0: \mu = 9.4$ minutes
 $H_a: \mu \neq 9.4$ minutes
 $\alpha = 0.01$
 $z = -1.18$
P-value = 0.2380
Since $0.2380 > 0.01$, do not reject H_0 .
At the 1% significance level, the data do not provide sufficient evidence to conclude that the mean call duration has changed from the 2000 mean of 9.4 minutes. The evidence against the null hypothesis is weak or none.
- 6) $H_0: \mu = 16.1$ ounces
 $H_a: \mu < 16.1$ ounces
 $\alpha = 0.10$
 $z = -1.49$
P-value = 0.0681
Since $0.0681 < 0.10$, reject H_0 .
At the 10% significance level, the data provide sufficient evidence to conclude that the mean amount of juice for the 16-ounce bottles is less than 16.1 ounces. The evidence against the null hypothesis is moderate.
- 7) $H_0: \mu = 160$. $H_1: \mu > 160$. Test statistic: $t = 9.583$. P-value < 0.005 . Reject H_0 . There is sufficient evidence to support the claim that the mean is greater than 160.
- 8) $H_0: \mu = 14$ oz. $H_1: \mu \neq 14$ oz. Test statistic: $t = 0.408$. Critical values: $t = \pm 3.499$. Fail to reject H_0 . There is not sufficient evidence to warrant rejection of the claim that the mean weight is 14 ounces.
- 9) $H_0: \mu = 900$ hrs. $H_1: \mu \neq 900$ hrs. Test statistic: $t = -4.342$. P-value < 0.01 . Reject H_0 . There is sufficient evidence to warrant rejection of the claim that the sample is from a population with a mean life of 900 hours. The light bulbs do not appear to conform to the manufacturer's specifications.