

Hypothesis Test Worksheet for One Population Proportion

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On this page we will see a number of situations with related questions. In each case, this page will give the answers to those questions. Your task is to find those same answers by inspecting the given information and/or by using a calculator or computer to produce those desired values.

Case 1:

Within a really large population items either have or do not have a particular characteristic. We want to test the hypothesis that the proportion of items with that characteristic in the population is 36.0% against the alternative that the true proportion is greater than 36.0%. We will perform this test at the 0.0650 level of significance. We take a sample of size 79 of that population. Within that sample we find that we have 36 items that have that particular characteristic.

- (1) State the null hypothesis. **(Answer: $H_0: p = 0.3600$)**
- (2) State the alternative hypothesis. **(Answer: $H_1: p > 0.3600$)**
- (3) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size? **(Answer: $\sigma_p = 0.0540$)**
- (4) For this style of test, because the sample proportions will have an approximately normal distribution, what z value will have 0.0650 as the area to the right of that value? **(Answer: $z = 1.514$)**
- (5) State the critical value(s) for this test. **(Answer: high = 0.442)**
- (6) State the proportion of items in the sample with the characteristic. **(Answer: phat = 0.4557)**
- (7) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): reject)**
- (8) Give the attained (achieved) significance for phat. **(Answer: attained = 0.0382)**
- (9) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: reject)**

Case 2:

Within a really large population items either have or do not have a particular characteristic. We want to test the hypothesis that the proportion of items with that characteristic in the population is 24.0% against the alternative that the true proportion is not equal to 24.0%. We will perform this test at the 0.0175 level of significance. We take a sample of size 83 of that population. Within that sample we find that we have 31 items that have that particular characteristic.

- (10) State the null hypothesis. **(Answer: $H_0: p = 0.2400$)**
- (11) State the alternative hypothesis. **(Answer: $H_1: p \neq 0.2400$)**
- (12) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size? **(Answer: $\sigma_p = 0.0469$)**
- (13) For this style of test, because the sample proportions will have an approximately normal distribution, what z values will have 0.0175 as the area further from 0 than those values? **(Answer: $z = \pm 2.376$)**
- (14) State the critical value(s) for this test. **(Answer: low = 0.129 and high = 0.351)**
- (15) State the proportion of items in the sample with the characteristic. **(Answer: phat = 0.3735)**
- (16) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): reject)**
- (17) Give the attained (achieved) significance for phat. **(Answer: attained = 0.0044)**
- (18) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: reject)**

Case 3:

Within a really large population items either have or do not have a particular characteristic. We want to test the hypothesis that the proportion of items with that characteristic in the population is 73.0% against the alternative that the true proportion is less than 73.0%. We will perform this test at the 0.0975 level of significance. We take a sample of size 78 of that population. Within that sample we find that we have 51 items that have that particular characteristic.

(19) State the null hypothesis. **(Answer: $H_0: p = 0.7300$)**

(20) State the alternative hypothesis. **(Answer: $H_1: p < 0.7300$)**

(21) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size?

(Answer: $\sigma_p = 0.0503$)

(22) For this style of test, because the sample proportions will have an approximately normal distribution, what z value will have 0.0975 as the area to the left of that value? **(Answer: $z = -1.296$)**

(23) State the critical value(s) for this test. **(Answer: $low = 0.665$)**

(24) State the proportion of items in the sample with the characteristic. **(Answer: $\hat{p} = 0.6538$)**

(25) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): reject)**

(26) Give the attained (achieved) significance for \hat{p} . **(Answer: $attained = 0.0649$)**

(27) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: reject)**

Case 4:

Within a really large population items either have or do not have a particular characteristic. We want to test the hypothesis that the proportion of items with that characteristic in the population is 63.0% against the alternative that the true proportion is greater than 63.0%. We will perform this test at the 0.0075 level of significance. We take a sample of size 80 of that population. Within that sample we find that we have 60 items that have that particular characteristic.

(28) State the null hypothesis. **(Answer: $H_0: p = 0.6300$)**

(29) State the alternative hypothesis. **(Answer: $H_1: p > 0.6300$)**

(30) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size?

(Answer: $\sigma_p = 0.0540$)

(31) For this style of test, because the sample proportions will have an approximately normal distribution, what z value will have 0.0075 as the area to the right of that value? **(Answer: $z = 2.432$)**

(32) State the critical value(s) for this test. **(Answer: $high = 0.761$)**

(33) State the proportion of items in the sample with the characteristic. **(Answer: $\hat{p} = 0.7500$)**

(34) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): do not reject)**

(35) Give the attained (achieved) significance for \hat{p} . **(Answer: $attained = 0.0131$)**

(36) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: do not reject)**

Case 5:

In the following table we have a sample taken from a large population. The items in that population can be classified in 3 different ways, which we have named by the values 1 through 3.

Table of sample characteristics																																		
3	3	1	2	2	3	3	3	2	3	3	1	3	1	3	3	3	3	1	2	1	3	3	3	3	2	1	3	3	2	1	3	1	3	
3	3	2	2	2	1	3	3	1	1	2	1	2	2	3	1	3	3	1	3	2	2	1	1	3	3	2	3	2	2	1	1	3	3	3
3	3	3	3	2	2	1	3	3	3	3	1	1	1	1	3	3	2	2	1	1	1	1												

You can generate this set of data using the command **gnrnd4(276559207,9653)**.

We are interested in testing the hypothesis that in the population the proportion of items with the characteristic assigned the value 3 is equal to 45.00% against the alternative that the proportion is greater than 45.00%. We want to run this test at the

0.0100 level of significance.

(37) State the sample size. **(Answer: $n = 93$)**

(38) State the number of items in the sample with the 3 characteristic. **(Answer: $x = 45$)**

(39) State the null hypothesis. **(Answer: $H_0: p = 0.4500$)**

(40) State the alternative hypothesis. **(Answer: $H_1: p > 0.4500$)**

(41) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size?

(Answer: $\sigma_p = 0.0516$)

(42) For this style of test, because the sample proportions will have an approximately normal distribution, what z value will have 0.0100 as the area to the right of that value? **(Answer: $z = 2.326$)**

(43) State the critical value(s) for this test. **(Answer: high = 0.570)**

(44) State the proportion of items in the sample with the 3 characteristic. **(Answer: $p = 0.4839$)**

(45) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): do not reject)**

(46) Give the attained (achieved) significance for p hat. **(Answer: attained = 0.2557)**

(47) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: do not reject)**

Case 6:

In the following table we have a sample taken from a large population. The items in that population can be classified in 3 different ways, which we have named by the values 1 through 3.

Table of sample characteristics																																		
1	2	3	3	2	3	2	1	1	1	2	1	3	1	1	3	2	2	1	3	1	2	2	3	2	2	1	1	2	1	2	3	1	1	
3	2	3	3	2	2	2	3	2	2	2	1	2	2	1	1	2	2	3	3	2	2	1	3	2	2	1	3	1	2	1	3	1	3	2
1	2	2	3	1	3	1	2	1	2	3	1	1	2																					

You can generate this set of data using the command **gnrnd4(292768307,5873)**.

We are interested in testing the hypothesis that in the population the proportion of items with the characteristic assigned the value 2 is equal to 40.00% against the alternative that the proportion is not equal to 40.00%. We want to run this test at the 0.0175 level of significance.

(48) State the sample size. **(Answer: $n = 84$)**

(49) State the number of items in the sample with the 2 characteristic. **(Answer: $x = 34$)**

(50) State the null hypothesis. **(Answer: $H_0: p = 0.4000$)**

(51) State the alternative hypothesis. **(Answer: $H_1: p \neq 0.4000$)**

(52) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size?

(Answer: $\sigma_p = 0.0535$)

(53) For this style of test, because the sample proportions will have an approximately normal distribution, what z values will have 0.0175 as the area further from 0 than those values? **(Answer: $z = \pm 2.376$)**

(54) State the critical value(s) for this test. **(Answer: low = 0.273 and high = 0.527)**

(55) State the proportion of items in the sample with the 2 characteristic. **(Answer: $p = 0.4048$)**

(56) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): do not reject)**

(57) Give the attained (achieved) significance for p hat. **(Answer: attained = 0.9290)**

(58) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: do not reject)**

Case 7:

In the following table we have a sample taken from a large population. The items in that population can be classified in 3 different ways, which we have named by the values 1 through 3.

Table of sample characteristics																																		
3	3	3	2	2	3	3	2	2	2	2	2	2	1	3	1	3	2	1	2	1	2	3	3	2	2	3	2	3	1	1	2	2	3	2
1	1	3	2	2	2	1	2	2	1	2	3	1	3	2	3	2	2	3	1	2	1	3	2	1	3	2	3	2	1	3	3	2	3	2
1	3	2	3	1	1	1	1	1	1	1	1	2	3	3	1																			

You can generate this set of data using the command **gnrnd4(221348507,5963)**.

We are interested in testing the hypothesis that in the population the proportion of items with the characteristic assigned the value 2 is equal to 45.00% against the alternative that the proportion is less than 45.00%. We want to run this test at the 0.0050 level of significance.

(59) State the sample size. **(Answer: $n = 86$)**

(60) State the number of items in the sample with the 2 characteristic. **(Answer: $x = 34$)**

(61) State the null hypothesis. **(Answer: $H_0: p = 0.4500$)**

(62) State the alternative hypothesis. **(Answer: $H_1: p < 0.4500$)**

(63) Assuming H_0 is true, what is the estimate of the standard deviation of sample proportions for samples of this size?

(Answer: $\sigma_p = 0.0536$)

(64) For this style of test, because the sample proportions will have an approximately normal distribution, what z value will have 0.0050 as the area to the left of that value? **(Answer: $z = -2.576$)**

(65) State the critical value(s) for this test. **(Answer: low = 0.312)**

(66) State the proportion of items in the sample with the 2 characteristic. **(Answer: $p = 0.3953$)**

(67) Based on that proportion and the critical value(s) do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on critical value(s): do not reject)**

(68) Give the attained (achieved) significance for \hat{p} . **(Answer: attained = 0.1542)**

(69) Based on that attained significance do we reject or not reject H_0 in favor of H_1 ? **(Answer: Based on attained significance: do not reject)**

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