

procedure for Hypothesis testing

① Null type hypothesis

$$H_0: \theta = \theta_0$$

$$H_0: \theta_1 = \theta_2$$

② Alternate hypothesis

$$H_1: \theta \neq \theta_0 \quad (\theta_1 \neq \theta_2)$$

$$H_1: \theta > \theta_0 \quad \rightarrow \text{Two tailed test}$$

$$\rightarrow \text{Right one tailed test}$$

$$H_1: \theta < \theta_0 \rightarrow \text{Left one tailed-test}$$

③ $\text{LOS} = \alpha\% = 1\% \text{ (or) } 5\%$

In probability value = ~~0.001~~ $0.01 \text{ (or) } 0.05$

$$Z_{1\%} = Z_{\text{Table}}$$

④ Test statistics

$$Z_{\text{cal}} = \frac{t - E(t)}{S.E(t)}$$

⑤ Comparison and Conclusion :-

$$|Z_{\text{cal}}| \leq |Z_{\text{table}}|$$

Z test for different proportions :-

the test statistics $Z =$

Z test for single mean :-

$$Z = \frac{\bar{X} - \mu}{\sigma / \sqrt{n}}$$

Z-test for Difference of means :-

$$Z = \frac{\bar{X}_1 - \bar{X}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

Z test for single proportion

Test ①

Test of significance of the difference between sample proportion and population proportion

the test statistics : $Z = \frac{p - P}{\sqrt{\frac{PQ}{n}}}$

Ques

The fatality rate of typhoid patient is believed to be 17.26%. In a certain year ~~60%~~ 640 patients suffering from typhoid were treated in a metropolitan hospital and only 63 patients died. Can you consider the hospital efficient?

sol $p = \frac{63}{640}$

$$p = 17.26\% \\ = \frac{17.26}{100}$$

$$Q = 1 - p$$

using formula

$$Z_{\text{test}} = \frac{p - P}{\sqrt{\frac{PQ}{n}}}$$

where $Q = 1 - p$

Now

Comparison and conclusion

$$|Z_{\text{cal}}| > (Z_{\text{tab}})$$

$$|-4.96| > (1.96)$$

H_0 is rejected.

H_1 is accepted. ✓

there is no significant difference between

PVP

One tail
and two tail

Ques A salesperson in a departmental store claims that at most 60% of the shoppers entering the store leaves without making a purchase. A random sample of 50 shoppers showed that 35 of them left without making a purchase. Are these sample results consistent with claim of the salesperson

Ques A large city A 20% of a random sample of 900 school boys had a slight physical defect. In another

Large city B, 18.5 percent of random sample of 1600 school boys had the same defect. Is the difference between the proportion significant?

Que

Before an increase in excise duty on tea, 800 people out of sample 1000 were consumers of tea. After increase on duty 800 people were consumers of tea in a sample of 1200 persons. Find whether there is significant difference decrease in the consumption of

Que

A sample of 100 students taken from a large population. The mean height of the students on this sample is 160 cm. Can it be reasonably regarded that population, the mean height 165 cm and S.D is 10 cm?

Ques The mean breaking strength of the cables supplied by a manufacturer is 1800 with a SD of 100. By a new technique in the manufacturing process, it is claimed that the breaking strength of the cable has increased. In order to test this claim, a sample of 50 cables is tested and it is found that the mean breaking strength is 1850 cm.

Ques

A simple sample of heights 6400 English men has a mean of 170 cm and a SD of 6.4 cm while a simple sample of heights of 1600 Americans has a mean of 172 cm and a SD of 6.3 cm. Do the data indicate that Americans are, on the average, taller than the Englishman.

$$\begin{array}{l|l} n_1 = 6400 & n_2 = 1600 \\ \hline \bar{Y}_1 = 170 & \bar{X}_2 = 172 \\ S_1 = 6.4 & S_2 = 6.3 \end{array}$$

$$Z_{test} = \frac{\bar{x}_1 - \bar{x}_2}{\sqrt{\frac{\sigma_1^2}{n_1} + \frac{\sigma_2^2}{n_2}}}$$

$\sigma_1 = ?$
 $\sigma_2 = ?$

$\left. \begin{array}{l} \sigma_1 = ? \\ \sigma_2 = ? \end{array} \right\} \rightarrow \text{unknown, unequal}$

Ques In a random sample of 500, the mean is found to be 20. In another independent sample of size 400, the mean is 15. Could the samples have been drawn from the same population with S.D 42?

8Q $\rightarrow m_3 \rightarrow 1Q \rightarrow$ Linear regression

1000
 classes

$m_4 \rightarrow 2Q$

$m_5 \rightarrow 2Q$

~~multiple reg~~
 D or Poisson
 Cont Expon
 Normal

\rightarrow proportion mean
 \rightarrow single mean
 \rightarrow Double proportion

[DA (2) Ques for CAT (2)]