

How can I use R to calculate the p-value of a given z-score?

Authored by
stats writer

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Using R, a statistical programming language, you can easily calculate the p-value of a given z-score. A z-score represents the number of standard deviations a data point is from the mean of a distribution. To calculate the p-value of a z-score, you can use the function "pnorm()" which calculates the cumulative probability from a given z-score. This function takes in the z-score as its input and returns the p-value, which represents the probability of obtaining a value equal to or more extreme than the given z-score. By utilizing this function in R, you can efficiently determine the significance of your z-score in relation to the distribution it is derived from.

Calculate the P-Value of a Z-Score in R

Often in statistics we're interested in determining the p-value associated with a certain z-score that results from a . If this p-value is below some significance level, we can reject the null hypothesis of our hypothesis test.

To find the p-value associated with a z-score in R, we can use the pnorm() function, which uses the following syntax:

```
pnorm(q, mean = 0, sd = 1, lower.tail = TRUE)
```

where:

q: The z-score
mean: The mean of the normal distribution. Default is 0.
sd: The standard deviation of the normal distribution. Default is 1.
lower.tail: If TRUE, the probability to the left of q in the normal distribution is returned. If FALSE, the probability to the right is

returned. Default is TRUE.

The following examples illustrate how to find the p-value associated with a z-score for a left-tailed test, right-tailed test, and a two-tailed test.

Left-tailed test

Suppose we want to find the p-value associated with a z-score of -0.77 in a left-tailed hypothesis test.

#find p-value

```
pnorm(q=-0.77, lower.tail=TRUE)
```

0.2206499

The p-value is 0.2206. If we use a significance level of $\alpha = 0.05$, we would fail to reject the null hypothesis of our hypothesis test because this p-value is not less than 0.05.

Right-tailed test

Suppose we want to find the p-value associated with a z-score of 1.87 in a right-tailed hypothesis test.

#find p-value

```
pnorm(q=1.87, lower.tail=FALSE)
```

```
0.03074191
```

The p-value is 0.0307. If we use a significance level of $\alpha = 0.05$, we would reject the null hypothesis of our hypothesis test because this p-value is less than 0.05.

Two-tailed test

Suppose we want to find the p-value associated with a z-score of 1.24 in a two-tailed hypothesis test.

```
#find p-value for two-tailed test
```

```
2*pnorm(q=1.24, lower.tail=FALSE)
```

```
0.2149754
```

The p-value is 0.2149. If we use a significance level of $\alpha = 0.05$, we would fail to reject the null hypothesis of our hypothesis test because this p-value is not less than 0.05.

You can also use this online to find p-values.