What is the definition and example of inverse normal distribution?

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Inverse normal distribution is a type of probability distribution that represents the inverse of a normal distribution. It is a continuous and symmetrical distribution that has a mean of 0 and a standard deviation of 1. This distribution is often used to transform data that follows a normal distribution into a uniform distribution. An example of inverse normal distribution is when we want to find the value of a variable that corresponds to a specific probability in a normal distribution.

Inverse Normal Distribution: Definition & Example

The term inverse normal distribution refers to the method of using a known probability to find the corresponding z-critical value in a .

This is not to be confused with the , which is a continuous probability distribution.

This tutorial provides several examples of how to use the inverse normal distribution in different statistical softwares.

Inverse Normal Distribution on a TI-83 or TI-84 Calculator

You're most likely to encounter the term "inverse normal distribution" on a TI-83 or TI-84 calculator, which uses the following function to find the z-critical value that corresponds to a certain probability:

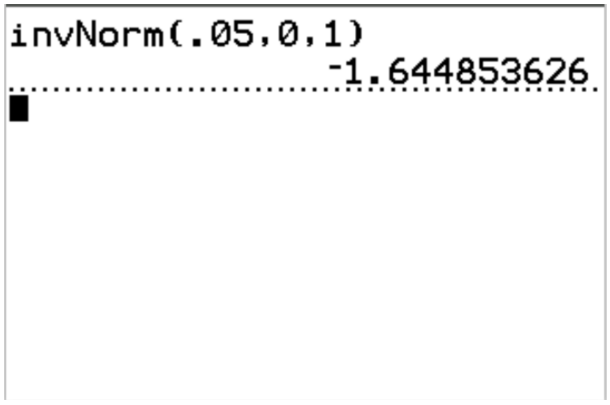
invNorm(probability, μ, σ)

where:

probability: the significance levelμ: population meanσ: population standard deviation

You can access this function on a TI-84 calculator by pressing 2nd and then pressing vars. This will take you to a DISTR screen where you can then use invNorm():

For example, we can use this function to find the z-critical value that corresponds to a probability value of 0.05:



The z-critical value that corresponds to a probability value of 0.05 is -1.64485.

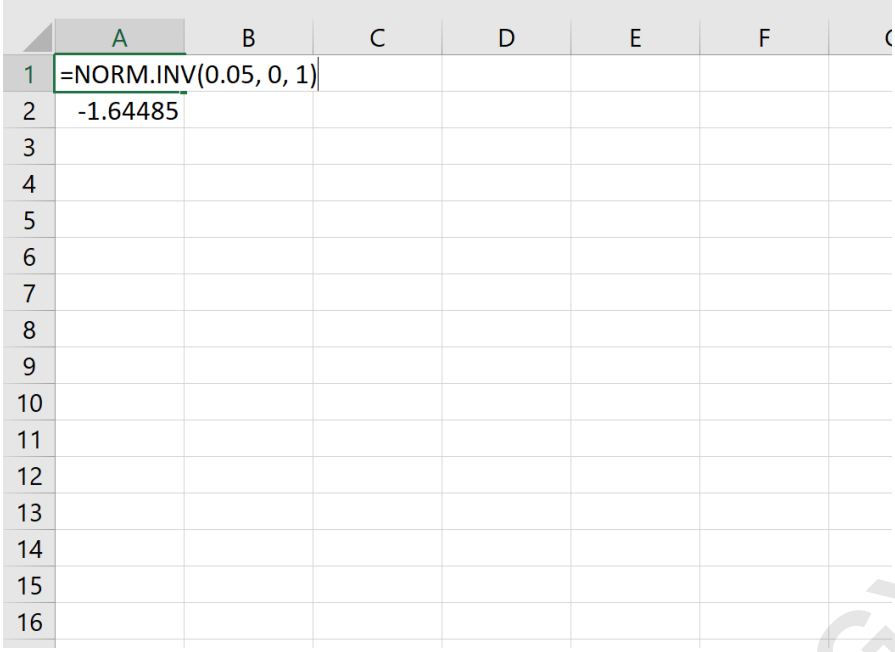
Inverse Normal Distribution in Excel

To find the z-critical value associated with a certain probability value in Excel, we can use the INVNORM() function, which uses the following syntax:

INVNORM(p, mean, sd)

p: the significance levelmean: population meansd: population standard deviation

For example, we can use this function to find the z-critical value that corresponds to a probability value of 0.05:



The z-critical value that corresponds to a probability value of 0.05 is -1.64485.

Inverse Normal Distribution in R

To find the z-critical value associated with a certain probability value in R, we can use the function, which uses the following syntax:

qnorm(p, mean, sd)

where:

p: the significance levelmean: population meansd: population standard deviation

For example, we can use this function to find the z-critical value that corresponds to a probability value of 0.05:

qnorm(p=.05, mean=0, sd=1)

-1.644854

Once again, the z-critical value that corresponds to a probability value of 0.05 is -1.64485.