P Value

with

Z Distribution

What is **P Value**?

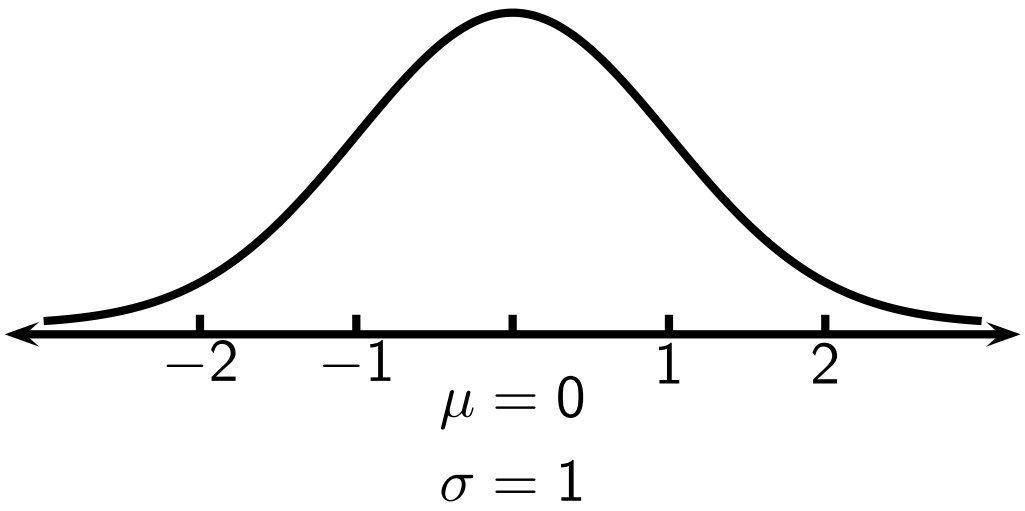
Assuming H_0 is valid, the p-value is is the probability of getting a value of the Computed Test Statistics that is at least as extreme as the one representing the sample data.

What does **P Value** provide?

The p-value provides the smallest level of significance for which the null hypothesis H_0 would be rejected and the alternative hypothesis H_1 would be supported.

What is **Z Distribution**?

It is a normal probability distribution with $\mu = 0$ and $\sigma = 1$. The total area under its density curve is equal to 1. The density curve is symmetric and bell-shaped.

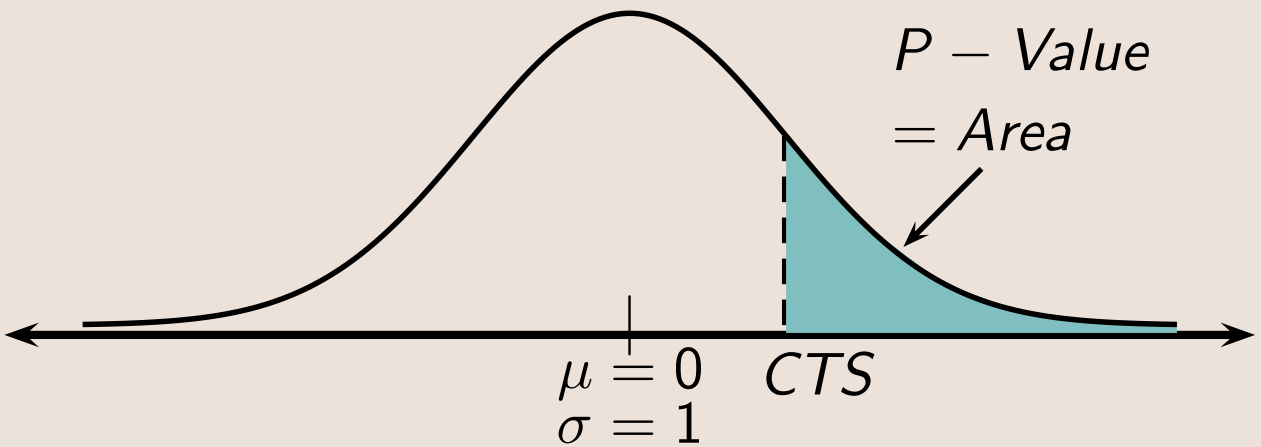


How does **P Value** look on the normal curve?

Solution:

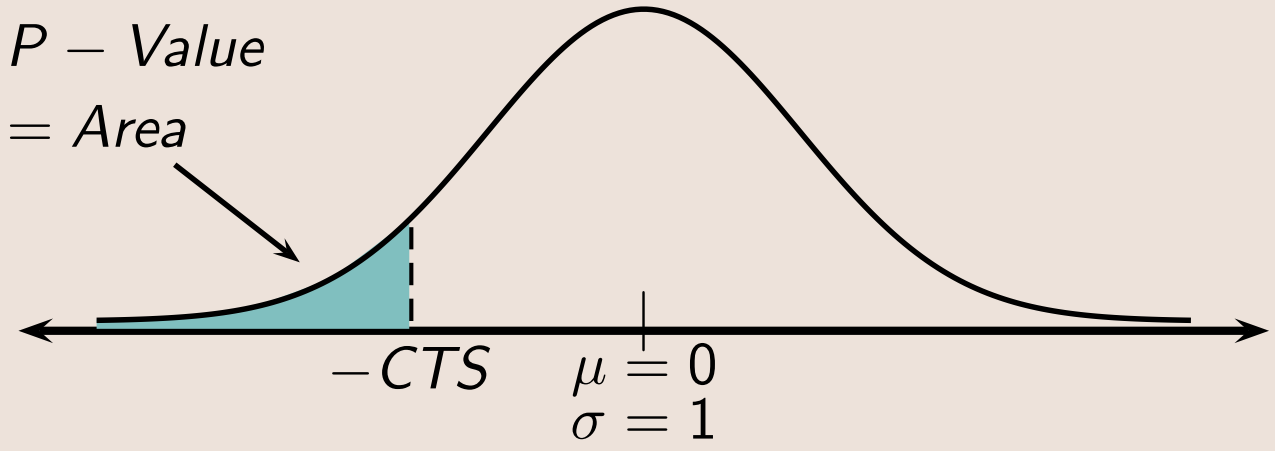
P-Value is the area of the tail marked by CTS. If it is Two-Tail Test, then multiply that area by 2.

- Right-Tail Test (Positive CTS):



Solution Continued:

- Left-Tail Test (Negative CTS):



- Two-Tail Test

Draw the bell curve, then

- Shade the right tail if CTS is positive.
- Shade the left tail if CTS is negative.
- P-Value is twice such shaded area.

P Value & CTS Z:

Testing Type	TI Command
Right-Tail Test	$\text{normalcdf}(CTS, E99, 0, 1)$
Left-Tail Test	$\text{normalcdf}(-E99, -CTS, 0, 1)$
Two-Tail Test	$2 \cdot \text{normalcdf}(CTS, E99, 0, 1)$
	$2 \cdot \text{normalcdf}(-E99, -CTS, 0, 1)$

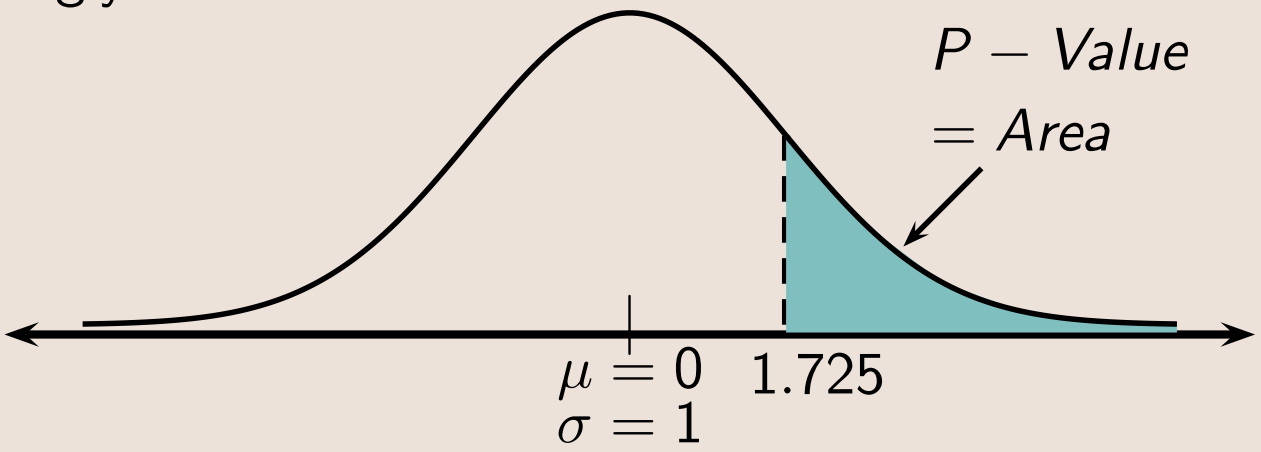
2ND , **VARS** , ↓ , **normalcdf**

Example:

Find the corresponding P-Value for a Right-Tail Test with $CTS\ z = 1.725$. Round to 3-decimal places.

Solution:

We start by drawing the bell curve, then shade and label accordingly.



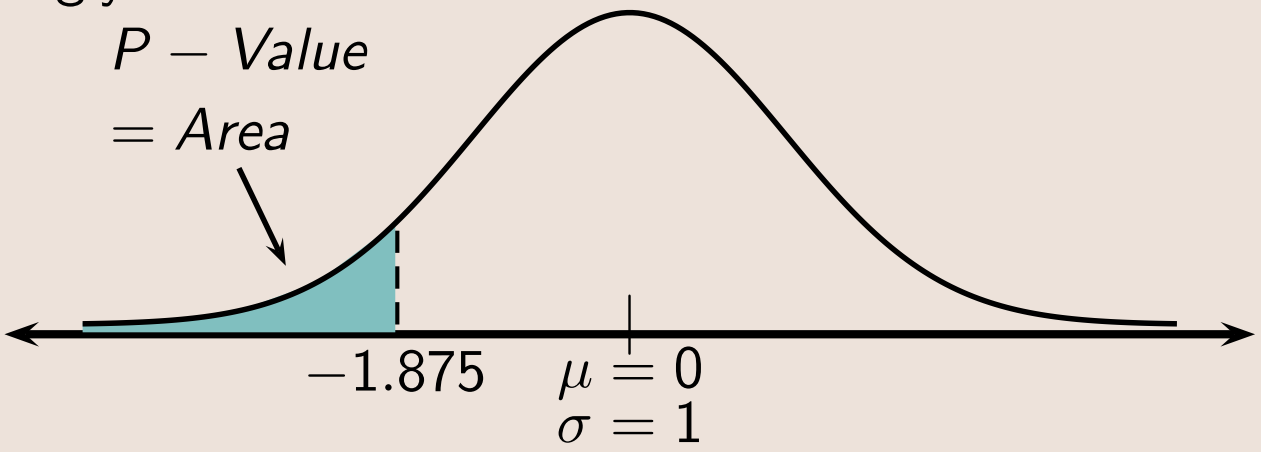
Now we can use the TI command,
$P - Value = normalcdf\,(1.725, E99, 0, 1) \approx 0.042$.

Example:

Find the corresponding P-Value for a Left-Tail Test with $CTS\, z = -1.875$. Round to 3-decimal places.

Solution:

We start by drawing the bell curve, then shade and label accordingly.



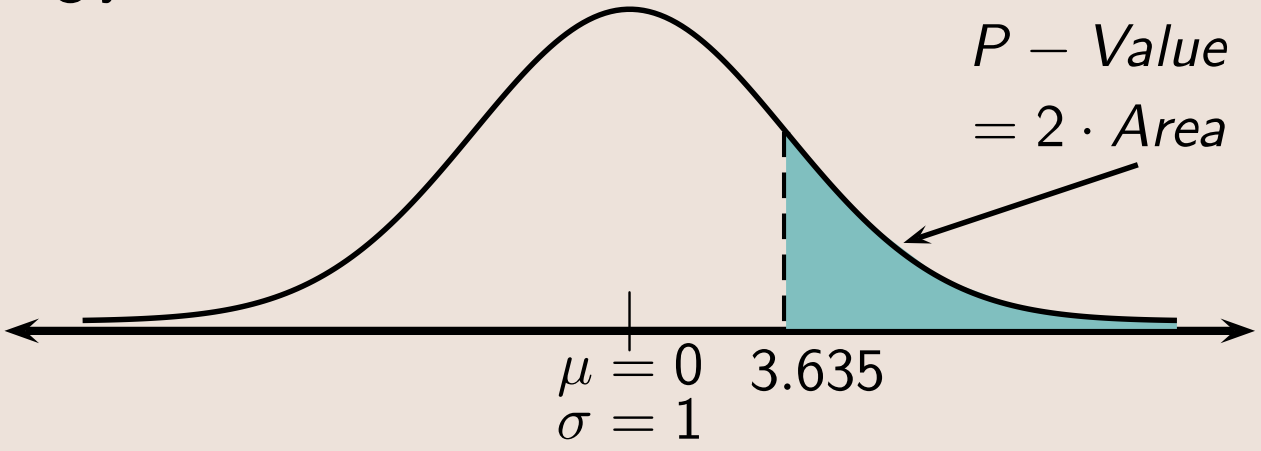
Now we can use the TI command,
$P - Value = normalcdf\,(-E99, -1.875, 0, 1) \approx 0.030$.

Example:

Find the corresponding P-Value for a Two-Tail Test with $CTS\ z = 3.635$.

Solution:

We start by drawing the bell curve, then shade and label accordingly.



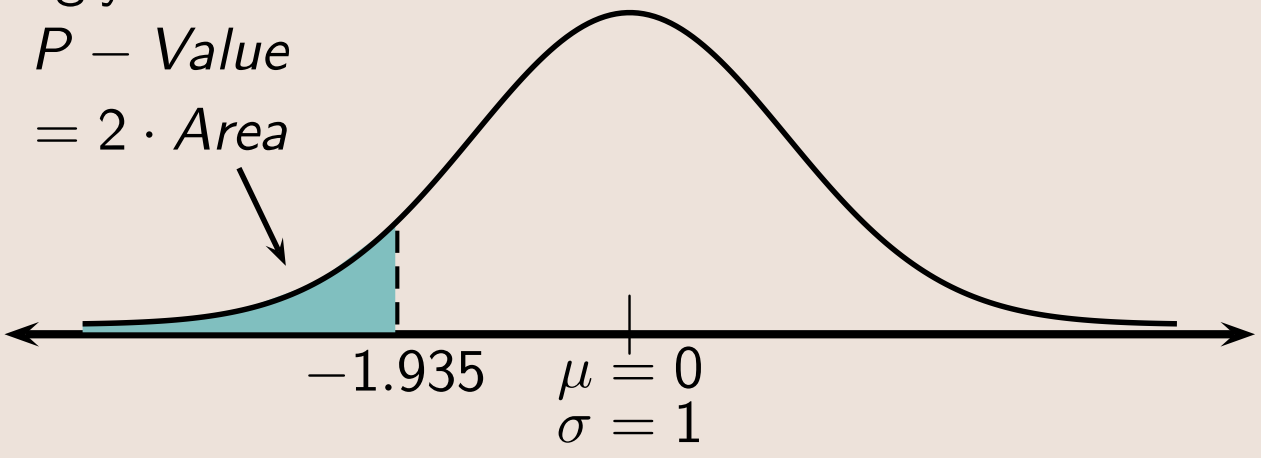
Now we can use the TI command,
$P - Value = 2 \cdot normalcdf\,(3.635, E99, 0, 1) \approx 2.8 \times 10^{-4}$.

Example:

Find the corresponding P-Value for a Two-Tail Test with $CTS\ z = -1.935$. Round to 3-decimal places.

Solution:

We start by drawing the bell curve, then shade and label accordingly.



Now we can use the TI command,
$P - Value = 2 \cdot normalcdf\,(-E99, -1.935, 0, 1) \approx 0.053.$