Obtaining $z_{\alpha/2}$ and $t_{\alpha/2}$ Values for a Given α

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Obtaining $z_{\alpha/2}$ Values Given α

Given α, there are two ways to obtain the value of $z_{\alpha/2}$:

- Use a Standard Normal Distribution table (TABLE II in the Sullivan text)
- Use the =NORMSINV() function of a spreadsheet

Obtaining $z_{\alpha/2}$ Values from a Table

To find $z_{\alpha/2}$ from the table, use the following procedure.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.

Obtaining $z_{\alpha/2}$ Values from a Table

To find $z_{\alpha/2}$ from the table, use the following procedure.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value.

Obtaining $z_{\alpha/2}$ Values from a Table

To find $z_{\alpha/2}$ from the table, use the following procedure.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value.

Step 3: Read up the column containing the value identified in step 1 to the top and note the number at the top of the column, which will be a decimal followed by a zero and one digit.

Obtaining $z_{\alpha/2}$ Values from a Table

To find $z_{\alpha/2}$ from the table, use the following procedure.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value.

Step 3: Read up the column containing the value identified in step 1 to the top and note the number at the top of the column, which will be a decimal followed by a zero and one digit.

Step 4: If the value in the "z" column is positive, $z_{\alpha/2}$ is the value in the "z" column identified in Step 2 plus the value at the top of the column identified in Step 3.

Obtaining $z_{\alpha/2}$ Values from a Table

To find $z_{\alpha/2}$ from the table, use the following procedure.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value.

Step 3: Read up the column containing the value identified in step 1 to the top and note the number at the top of the column, which will be a decimal followed by a zero and one digit.

Step 4: If the value in the "z" column is positive, $z_{\alpha/2}$ is the value in the "z" column identified in Step 2 plus the value at the top of the column identified in Step 3.

Step 5: If the value in the "z" column is negative, $z_{\alpha/2}$ is the value in the "z" column identified in Step 2 minus the value at the top of the column identified in Step 3.

Obtaining $z_{\alpha/2}$ Values from a Table

Example: Find $z_{\alpha/2}$ if $\alpha = 0.05$.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.
$1 - 0.025$ is 0.975.
The value in the table is 0.9750.

Obtaining $z_{\alpha/2}$ Values from a Table

Example: Find $z_{\alpha/2}$ if $\alpha = 0.05$.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.
$1 - 0.025$ is 0.975.
The value in the table is 0.9750.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value. In this case, it's 1.9.

Obtaining $z_{\alpha/2}$ Values from a Table

Example: Find $z_{\alpha/2}$ if $\alpha = 0.05$.

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$1 - 0.025$ is 0.975.
The value in the table is 0.9750.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value. In this case, it's 1.9.

Step 3: Read up the column containing the value identified in step 1 to the top and note the number at the top of the column, which will be a decimal followed by a zero and one digit. In this case, it's $.06$.

Obtaining $z_{\alpha/2}$ Values from a Table

Example: Find $z_{\alpha/2}$ if $\alpha = 0.05$.

Step 1: Find the smallest value in the **body** of the table that is greater than or equal to $1 - \alpha/2$.
$1 - 0.025$ is 0.975.
The value in the table is 0.9750.

Step 2: Read across the row containing the value identified in step 1 to the "z" column, and note the value. In this case, it's 1.9.

Step 3: Read up the column containing the value identified in step 1 to the top and note the number at the top of the column, which will be a decimal followed by a zero and one digit. In this case, it's $.06$.

Step 4: The value in the "z" column is positive, so $z_{\alpha/2}$ is the value in the "z" column identified in Step 2 (1.9) plus the value at the top of the column identified in Step 3 $(.06)$. So, $z_{\alpha/2} = 1.96$.

Obtaining $z_{\alpha/2}$ Values Using a Spreadsheet

An easier way to obtain $z_{\alpha/2}$ is to use a spreadsheet.

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The **NORMSINV()** function of a spreadsheet computes z values from $\alpha/2$ values.

The argument to the NORMSINV() function is $\alpha/2$.

Obtaining $z_{\alpha/2}$ Values Using a Spreadsheet

An easier way to obtain $z_{\alpha/2}$ is to use a spreadsheet.

The **NORMSINV()** function of a spreadsheet computes z values from $\alpha/2$ values.

The argument to the NORMSINV() function is $\alpha/2$.

The formula that goes in the cell is:

=NORMSINV($\alpha/2$**)**

Obtaining $z_{\alpha/2}$ Values Using a Spreadsheet

Example: If $\alpha = 0.05$, find $z_{\alpha/2}$.

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Example: If $\alpha = 0.05$, find $z_{\alpha/2}$.

Solution: $\alpha/2$ is 0.025.
The formula is:

=NORMSINV(0.025)

The result is 1.9600, which is $z_{\alpha/2}$.

Obtaining $t_{\alpha/2}$ Values Given α

Given α, there are two ways to obtain the value of $t_{\alpha/2}$:

- Use a t-Distribution table (TABLE III in the Sullivan text)
- Use the =TINV() function of a spreadsheet

Obtaining $t_{\alpha/2}$ Values from a Table

To find $t_{\alpha/2}$ from the table, use the following procedure.

Step 1: Calculate $\alpha/2$.

Obtaining $t_{\alpha/2}$ Values from a Table

To find $t_{\alpha/2}$ from the table, use the following procedure.

Step 1: Calculate $\alpha/2$.

Step 2: Find the column whose heading matches the value of $\alpha/2$.

(If there is no such column, use a spreadsheet to find $t_{\alpha/2}$)

Obtaining $t_{\alpha/2}$ Values from a Table

To find $t_{\alpha/2}$ from the table, use the following procedure.

Step 1: Calculate $\alpha/2$.

Step 2: Find the column whose heading matches the value of $\alpha/2$.

(If there is no such column, use a spreadsheet to find $t_{\alpha/2}$)

Read down the column to the row whose value in the "df" column matches n, the sample size. This value is $t_{\alpha/2}$.

If there is no exact match in the "df" column, use the row with the largest "df" value that is smaller than the sample size n.

Obtaining $t_{\alpha/2}$ Values from a Table

Example: Find $t_{\alpha/2}$ for $\alpha = 0.05$ and a sample size of 40.

Step 1: Calculate $\alpha/2$. The value is 0.025.

Obtaining $t_{\alpha/2}$ Values from a Table

Example: Find $t_{\alpha/2}$ for $\alpha = 0.05$ and a sample size of 40.

Step 1: Calculate $\alpha/2$. The value is 0.025.

Step 2: There is a column whose heading is 0.025, so we can find $t_{\alpha/2}$ without a spreadsheet.

Obtaining $t_{\alpha/2}$ Values from a Table

Example: Find $t_{\alpha/2}$ for $\alpha = 0.05$ and a sample size of 40.

Step 1: Calculate $\alpha/2$. The value is 0.025.

Step 2: There is a column whose heading is 0.025, so we can find $t_{\alpha/2}$ without a spreadsheet.

Read down the column to the row whose value in the "df" column is 40. The number is 2.021, which is $t_{\alpha/2}$.

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The **TINV()** function of a spreadsheet computes t values from α values.

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An easier way to obtain $z_{\alpha/2}$ is to use a spreadsheet.

The **TINV()** function of a spreadsheet computes t values from α values.

The argument to the NORMSINV() function is α.

Obtaining $t_{\alpha/2}$ Values Using a Spreadsheet

An easier way to obtain $z_{\alpha/2}$ is to use a spreadsheet.

The **TINV()** function of a spreadsheet computes t values from α values.

The argument to the NORMSINV() function is α.

The formula that goes in the cell is:

=NORMSINV(α)

Obtaining $t_{\alpha/2}$ Values Using a Spreadsheet

Example: If $\alpha = 0.05$, find $t_{\alpha/2}$ for a sample size of 40.

Obtaining $t_{\alpha/2}$ Values Using a Spreadsheet

Example: If $\alpha = 0.05$, find $t_{\alpha/2}$ for a sample size of 40.

Solution: Because the **TINV()** function computes t values for a two-sided confidence interval, we *do not* have to compute $\alpha/2$.

The arguments supplied to TINV() are α and the sample size n.

Obtaining $t_{\alpha/2}$ Values Using a Spreadsheet

Example: If $\alpha = 0.05$, find $t_{\alpha/2}$ for a sample size of 40.

Solution: Because the **TINV()** function computes t values for a two-sided confidence interval, we *do not* have to compute $\alpha/2$.

The arguments supplied to TINV() are α and the sample size n.

The formula is:

=TINV(0.05,40)

The result is 2.0211, which is the value of $t_{\alpha/2}$.