

A.P. Statistics
TI-Nspire Calculator Commands

Topic 1: Exploring Data (Describing Patterns)

Descriptive Statistics for **Univariate** Data

- Enter data into the Spreadsheet Screen and name your column the appropriate name.
 - Menu → Stat Calculations → One-Variable Statistics
 - Set “X1 List” as the title of your data column
 - Hit ENTER and find your results in the spreadsheet.

Graphical Displays for **Univariate** Data

- Enter data into the Spreadsheet Screen and name your column the appropriate name.
- Go to the home screen and then the Histogram Screen.
- “Click to Add Variable” on the x-axis and choose the appropriate label.
- To change the *type* of graph:
 - Menu → Plot Type → Choose what you want

Descriptive Statistics for **Bivariate** Data

- Enter both sets of data into the Spreadsheet Screen and name your columns the appropriate name.
 - Menu → Stat Calculations → Linear Regression (a + bx)
 - Set “X List” as the title of your data column for the *explanatory variable*.
 - Set “Y List” as the title of your data column for the *response variable*.
 - Hit ENTER and find your results in the spreadsheet.

Scatterplots and Residual Plots

- Complete the above steps for “Descriptive Statistics for Bivariate Data”
- For Scatterplots:
 - Go to the Histogram Screen.
 - “Click to Add Variable” for both axes. Name the x-axis the title of the *explanatory variable*. Name the y-axis the title of the *response variable*.
 - For the Least Squares Regression Line:
 - Remaining on the screen with the scatterplot:
Menu → Analyze → Regression → Show Linear (a + bx)
- For Residual Plots:
 - ****Make sure the steps for “Descriptive Statistics for Bivariate Data” above have been completed on the Spreadsheet Screen****
 - Go to the Histogram Screen
 - “Click to Add Variable” for both axes. Name the x-axis the title of the *explanatory variable*. Name the y-axis “**stat.resid**”.

Transforming Non-Linear Data

- Complete the above steps for “Descriptive Statistics for Bivariate Data”
- Look at the Residual Plot of the data to determine if it shows a pattern. If a pattern is present and does not look random, we have to transform the data!
- On the Spreadsheet Screen, add two more columns of data:
 - Label one column “**logx**” and the other column “**logy**”
 - Starting in the **logx** column, move to the gray cell, the second cell from the top.
 - Hit enter and “logx: =” should pop up. Type in **log(Title of Explanatory Variable)** . So, if your explanatory is “height”, you would type in log(height).
 - Hit enter and the data should pop up in the column.
 - Now move to the **logy** column, move to the gray cell, the second cell from the top.
 - Hit enter and “logy: =” should pop up. Type in **log(Title of Response Variable)** . So, if your response is “weight”, you would type in log(weight).
 - Hit enter and the data should pop up in the column.
- You will now have to calculate the “Descriptive Statistics for Bivariate Data” two more times.
 - In one column, find the descriptive statistics with the X List as “Title of Explanatory Variable” and the Y List as “logy.” (**Exponential Model**)
 - In another column find the descriptive statistics with the X List as “logx” and the Y List as “logy”. (**Power Model**)
 - Now compare the 3 sets of Descriptive Statistics. One with (x,y), one with (x, logy) and one with (logx,logy).
 - Choose the model with the highest r^2 value.

Probability Distributions

Note: You can find all the commands below if you go to...
Menu → Statistics → Distributions

If you choose this option, you don't have to type out the commands and you don't have to memorize what to plug in after the parentheses. :)

Distribution	Command	What does command tell me?	If you type it out...
Normal	Normal Cdf...	<ul style="list-style-type: none"> - Probability with a Normal Distribution - P-value with a Z-Test. 	<p>normcdf(lower bound, upper bound, mean, standard deviation)</p> <p style="text-align: center;">OR</p> <p>If you have already calculated the z-score, plug it in as either the upper or lower bound, and you don't have to plug in the mean and standard deviation</p>
	Inverse Normal...	<ul style="list-style-type: none"> - The z-score if you already know the probability. 	<p>invnorm(left-tail probability, mean, standard deviation)</p>
Binomial	Binomial Pdf...	<ul style="list-style-type: none"> - Probability of exactly "k" successes in a binomial experiment. 	<p>binompdf(n, p, k)</p> <p>n = # trials p = probability of success k = # of successes we want</p>

Distribution	Command	What does command tell me?	If you type it out...
	Binomial Cdf...	- Probability of getting between "m" and "k" successes in a binomial experiment.	binomcdf (n, p, m, k) n = # trials p = probability of success m = the smallest # of success we want (m = 0 when the problem is "k or less") k = the highest # of successes we want
Geometric	Geometric Pdf...	- Probability of exactly "k" successes in a geometric experiment.	geompdf (p, k) p = probability of success k = # of successes we want
	Geometric Cdf...	- Probability of getting between "m" and "k" successes in a geometric experiment.	geomcdf (p, m, k) p = probability of success m = the smallest # of success we want (m = 0 when the problem is "k or less") k = the highest # of successes we want
T	T Cdf...	- P-Value with a T-Test	tcdf (lower bound, upper bound, degrees of freedom) df = n - 1 Remember, lower bound or upper bound, depending on the problem, will be the value of the test statistic. The value of the other bound will either be -99999 or 99999.

Distribution	Command	What does command tell me?	If you type it out...
χ^2	χ^2 Cdf...	-P-Value with a χ^2 - Test	χ^2 cdf (lower bound, upper bound, degrees of freedom) Goodness of Fit: df = k - 1 k = # groups Independence: df = (r - 1)(c - 1) r = # rows c = # columns Remember, lower bound or upper bound, depending on the problem, will be the value of the test statistic. The value of the other bound will either be -99999 or 99999.

Inference: Confidence Intervals and Hypothesis Tests

Confidence Intervals:

Menu → Statistics → Confidence Intervals

- Once you have reached that point, select the appropriate confidence intervals for your situation.
- When the “Data Input Method” screen appears...
 - Choose **Stats** if you already have the information needed from the problem (mean, standard deviation, etc.).
 - Choose **Data** if the problem only gives you a set of data and nothing else (no mean, no standard deviation, etc). If this is the case, you will need to input the data into the Spreadsheet Screen first and name it with an appropriate title. Then, you can do a confidence interval with the data.
- Make sure you change the confidence level (“C Level”) to the appropriate number before moving on.
- Remember, “CLower” and “CUpper” are the bound for your confidence interval.

Hypothesis Tests:

Menu → Statistics → Stat Tests

- Once you have reached that point, select the appropriate hypothesis test for your situation.
- When the “Data Input Method” screen appears...
 - Choose **Stats** if you already have the information needed from the problem (mean, standard deviation, etc.).
 - Choose **Data** if the problem only gives you a set of data and nothing else (no mean, no standard deviation, etc). If this is the case, you will need to input the data into the Spreadsheet Screen first and name it with an appropriate title. Then, you can do a hypothesis test with the data.
- Remember to change your Alternative Hypothesis (H_a) to what’s appropriate for the problem.
- For χ^2 GOF Test:
 - Make sure you enter your data into the Spreadsheet Screen first with an “Observed” column and an “Expected” column. Then you can follow the steps above.
- For χ^2 Two-Way Test (Independence)
 - Plug your **observed** counts into a matrix first and store the matrix as some name. Then you can follow the steps above.
 - To make a matrix, Menu → Matrix & Vectors → Create → Matrix
 - To store the matrix, after plugging in the numbers into the matrix, move your cursor to the outside of the matrix and hit **Control** → **Var**. Name the matrix the appropriate name and hit Enter.