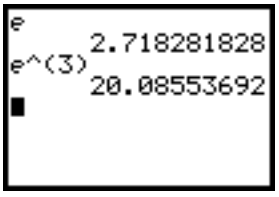
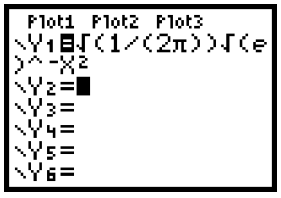
CHAPTER 11 Calculator Notes for the TI-83 Plus and TI-84 Plus

Note 11A • Entering *e*

To display the value of *e*, press 2nd [e] ENTER. To define an exponential expression or function with base *e*, press 2nd [e^x].





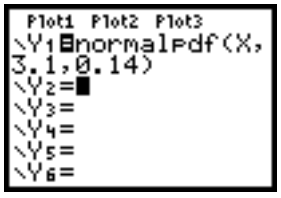
Note 11B • Normal Graphs

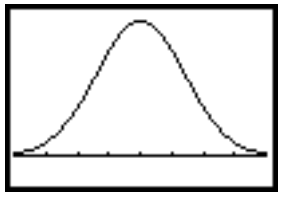
You can easily graph a normal curve with the normal probability distribution function, **normalpdf(**. To find the **normalpdf(** command, press 2nd [DISTR] **1:normalpdf(**.

Follow these steps to graph a normal curve in Function mode:

- **a.** Make note of the mean, μ, and the standard deviation, σ, of the distribution.
- **b.** Press Y= and define **Y1=normalpdf(X,μ,σ)**. Enter the numerical values of μ and σ. Or if you have stored your data into lists and used **1-Var Stats** to calculate the mean and standard deviation, you can use the exact values by pressing VARS **5:Statistics**, and selecting **2:$\bar{x}$** for the mean and **4:σx** for the standard deviation.
- **c.** Set an appropriate window.
- **d.** Press GRAPH.

These screens show a normal curve with a mean 3.1 and standard deviation 0.14.





[2.7, 3.5, 0.1, −0.5, 3, 0]

To graph the standard normal distribution, that is, a normal curve with mean 0 and standard deviation 1, you need enter only **normalpdf(X)**.

Note 11C • Probabilities of Normal Distributions

Calculating Ranges

The normal cumulative distribution function, **normalcdf(**, calculates the area under a normal curve between two endpoints. To find the **normalcdf(** command, press 2nd [DISTR] **DISTR 2: normalcdf(**. For a standard normal distribution with mean 0 and standard deviation 1, enter **normalcdf(***lower,upper*). For any normal distribution, with mean μ

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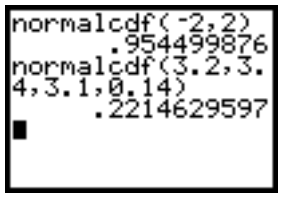
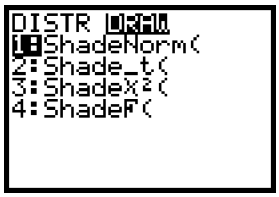
and standard deviation σ, enter the command in the form **normalcdf(***lower,upper,* μ*,* σ**)**.

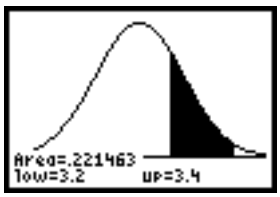


Graphing Ranges

The **ShadeNorm(** command graphs the normal curve and shades the area between the specified endpoints. It also reports the probability associated with that area. To find the **ShadeNorm(** command, press 2nd [DISTR] **DRAW 1:ShadeNorm(**.

To use the command, first set an appropriate window. Then, on the Home screen, enter the command in the form **ShadeNorm(***lower,upper,* μ*,* σ**)**.



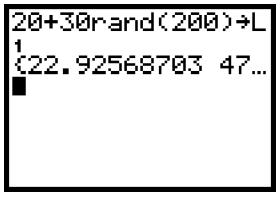


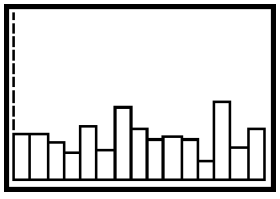
[2.7, 3.5, 0.1, −0.5, 3, 0]

Note 11D • Creating Random Probability Distributions

You can create lists of various kinds of distributions.

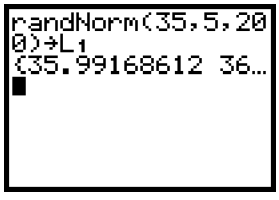
a. To create a uniform distribution, use MATH **PRB 1:rand**. This example creates a list of 200 values uniformly distributed between 20 and 50.

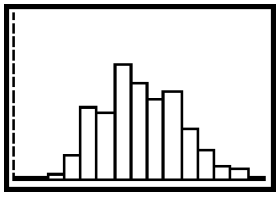




[20, 50, 2, 0, 50, 1]

b. To create a normal distribution, use MATH **PRB 6:randNorm(**. This example creates a list of 200 values with mean 35 and standard deviation 5. Almost all of the values will be between 20 and 50.





[20, 50, 2, 0, 50, 1]

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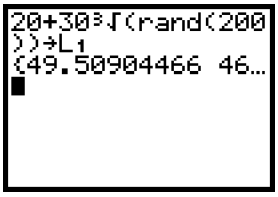
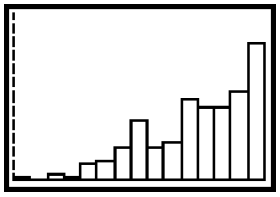
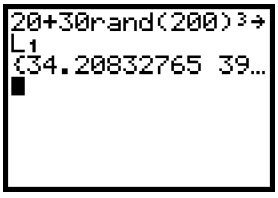
c. To create a left-skewed distribution, use the cube root of **rand(**. This example creates a left-skewed population of 200 values between 20 and 50.

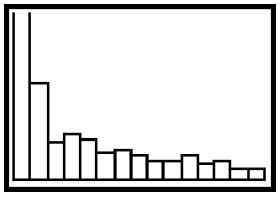




[20, 50, 2, 0, 50, 1]

d. To create a right-skewed distribution, use the cube of **rand(**. This example creates a right-skewed population of 200 values between 20 and 50.





[20, 50, 2, 0, 50, 1]

Note 11E • Correlation Coefficient

There are two ways to find a correlation coefficient, *r,* using the calculator. You can manually enter the calculations yourself, or you can have the calculator do the work for you.

First store your bivariate data into two lists, say list L1 for the *x*-values and list L2 for the *y*-values.

Follow these steps to manually calculate *r:*

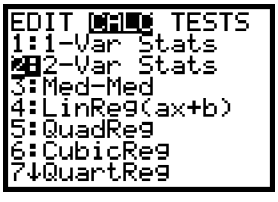
a. Calculate the two-variable statistics that you need for the formula by pressing [STAT] **CALC 2:2-Var Stats** [2nd] [L1] [,] [2nd] [L2] [ENTER].

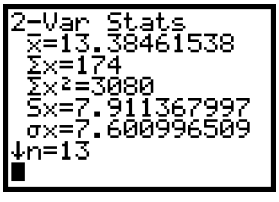
b. Start inputting the formula $\frac{\Sigma(x-\bar{x})(y-\bar{y})}{s_x s_y(n-1)}$ by entering **sum(**(L1−. Do not press [ENTER] yet. To find the **sum(** command, press [2nd] [LIST] **MATH 5:sum(**.

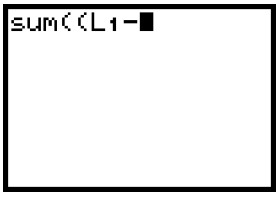
c. Press [VARS] **5:Statistics 2:**$\bar{x}$ to enter $\bar{x}$ into the expression. Notice that by pressing [VARS] **5:Statistics** you can also get **1:n, 3:Sx, 5:**$\bar{y}$, and **6:Sy**.

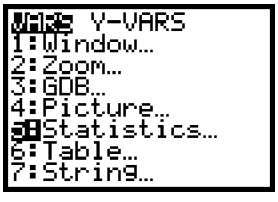
d. Enter the rest of the formula, ((L2−$\bar{y}$))/(SxSy(n−2)).

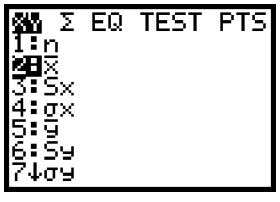
e. Press [ENTER] to display the value of *r*.

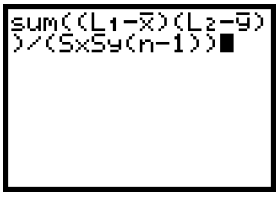


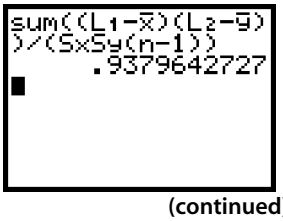












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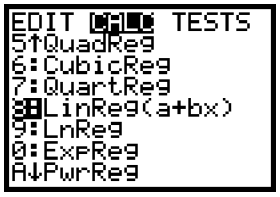
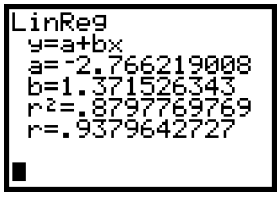
Follow these steps to have the calculator compute *r:*

a. Press 2nd [CATALOG] [D]. Scroll down to **Diagnostic On.** Press ENTER ENTER. (Note: You need to do this step only once. After you turn the diagnostics on, the setting remains on.)

b. Press STAT CALC **8:LinReg(a+bx)** 2nd [L1] , 2nd [L2] ENTER. (Note: You can also use **4:LinReg(ax+b)** instead of **8:LinReg(a+bx).**)

c. The calculator displays the value of *r,* as well as other information about the least squares line, which you'll learn about later.

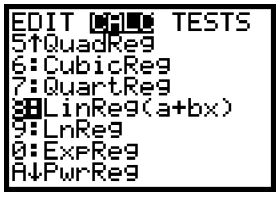


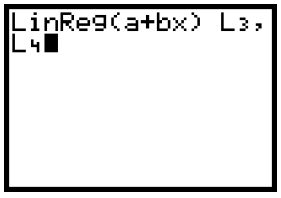


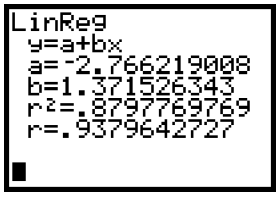
Note 11F • Least Squares Line

The calculator can find the equation of the least squares line in either the form $y = ax + b$ or the form $y = a + bx$. To find the least squares commands, press STAT CALC **4:LinReg(ax+b)** or **8:LinReg(a+bx)**. Either command defaults to using list L1 for the *x*-values and list L2 for the *y*-values, but you may specify another pair of lists by following the command with the list names separated by a comma.

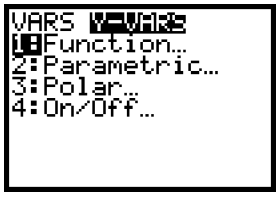
When you press ENTER the calculator displays the slope and *y*-intercept of the least squares line; the correlation coefficient, *r;* and the coefficient of determination, r^2.

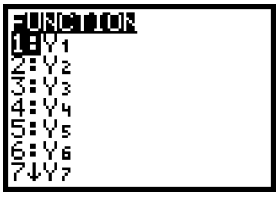


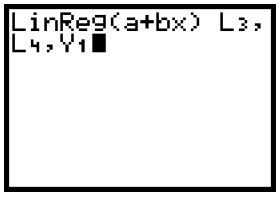


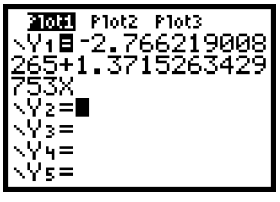


To enter the equation of the least squares line into the Y= screen, enter a function name after the command. Find the function names by pressing VARS **Y-VARS 1:Function.**









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If you forget to specify a function name, you can later paste the least squares equation into the Y= screen. Press [Y=] and go to the desired function. Then press [VARS] **5:Statistics**, go to the **EQ** submenu, and select **1:RegEq**.