

Graphing Calculator Instructions TI-83

Introduction: In the instructions below, menu choices and keys are shown in capital letters. The word “press” is used to indicate an actual key which should be pressed. The word “select” is used to indicate a menu choice to be selected.

1. **Graphing a function**

Press $Y=$ and enter your function using the X, T, 0, n key for the x variable. Then press GRAPH.

2. **Zooming the graph window**

Press ZOOM; select Zoom type from menu; for example:

Zoom In--zooms in

Zoom out--zooms out

Z standard--standard zoom, calculator default

ZTrig—Trigonometric zoom

3. **Selecting or deselecting a graph**

Any function in the $y(x)$ window with a highlighted equal sign is a “selected function”. When you graph, all selected functions will be graphed in the graph window. To select or deselect a graph, go to the function list $y(x)$, put the cursor on the equal sign of the desired function and press ENTER.

4. **Tracing a curve**

After the function is graphed, press TRACE, move the cursor and read the x, y coordinates at the bottom of the window.

5. **Finding the y-intercept of a function**

With the graph displayed, press CALC (2nd TRACE); this automatically selects 1: *value*, so just press ENTER; then enter 0 for the x value. Read the coordinates of the y- intercept at the bottom of the screen.

6. **Finding the x-intercepts of a function (roots)**

With the graph displayed press CALC (2nd TRACE), select 2: *zero* and press ENTER. Position the cursor to the left of the x- intercept and press enter. Now position the cursor to the right of the x-intercept and press ENTER. Press ENTER again, and read the coordinates at the bottom of the screen. If you want to find other roots, repeat the process but select points to the left and right of the other intercept.

7. **Finding the Maximum or Minimum point of a function**

With the graph displayed, press CALC (2nd TRACE), select 3: *minimum* or 4: *maximum* and press ENTER. Position the cursor to the left of the maximum (or *minimum*) and press enter. Now position the cursor to the right of the maximum (or *minimum*) and press ENTER. Enter your guess or press ENTER, and read the coordinates at the bottom of the screen.

8. Finding the intersection of two curves

Press $Y=$. Enter the functions on the screen. Press $CALC$ (2^{nd} TRACE), select 5: *intersect* position the cursor on the first curve, press $ENTER$. Position the cursor on the second curve and press $ENTER$, and read the coordinates at the bottom of the screen. If there is more than one point of intersection, you can get the other point by positioning the cursor closer to it when you select the second curve, or guess an x value closer to the intersection you want.

9. Finding the slope of a curve at a given point

With the graph displayed press $CALC$ (2^{nd} TRACE), select 6: dy/dx , press $ENTER$. Move the cursor to the point at which you want to find a slope then press $ENTER$.

10. Drawing a tangent line to a curve at a given point

With the graph displayed press $DRAW$ (2^{nd} PRGM), select 5: *tangent* (. Move the cursor to the point of tangency, then press $ENTER$. The x coordinate of the point of tangency and the equation of the tangent will be displayed at the bottom of the window.

11. Changing the graphing range

Press $WINDOW$. Fill in the values you wish to use for max/min on x and y axes. $xSc1$ and $ySc1$ set the scale on x and y axis. Do not change $xres$. Press $QUIT$.

12. Finding $f(x)$ for a given value of x

You can find $f(x)$ for any x as follows. First check that your function has been selected (i.e. equal sign is highlighted when you press $Y=$). Press $CALC$ (2^{nd} TRACE), select 1: *value* enter an x value. The corresponding $f(x)$ value will be displayed.

13. Displaying a table of values for a function

Select a function in the $Y=$ window. Press $TBLSET$ (2^{nd} window). Enter a starting value next to $TblStart=$ and an increment next to $\Delta TBL=$. Now press $TABLE$ (2^{nd} GRAPH) to display the table. Move around the table with the cursor arrows.

14. Solving systems of linear equations

See #8 above.

15. Finding the roots of a non-linear equation

First graph the equations and note the approximate solution (i.e. the x - intercepts). Now press $MATH$ and select 0: *Solver*. Enter the equation next to $eqn:0=$. Next to $X=$ enter one of your approximations. Now press $ALPHA$, then press $SOLVE$ (button over the $ENTER$ key) to read the solution. Enter any of the other approximations to get the other solutions.

16. Using a variable to store a number

On the home screen enter the number you wish to store, or press ANS if you want to store the answer to the previous calculation. Press $STO\rightarrow$. Press $ALPHA$ (to enter a letter) enter one letter for the variable name of 8 characters) then press enter.

17. Recalling a value stored in a variable

To recall a stored value, press RCL (note calculator automatically switches to alpha mode to accept a letter), enter the variable name you wish to use. You may also press ALPHA, then press SOLVE (button over the ENTER key), the calculated value should appear for the unknown.

18. Time-Value-Money (TVM), annuities and loans

Press 2nd FINANCE and select 1: TVM Solver and enter the known quantities in the table. Leave the unknown quantity blank. Move the cursor to the unknown and press ALPHA, then press SOLVE (button over the ENTER key), the calculated value should appear for the unknown.

Variables used in TVM (Time-Value-Money) Solver

- N= Total number of payment periods
- I%= Annual interest rate (enter in as %; e.g. 5% is entered as “5”, NOT “.05”)
- PV= Present value
- PMT= Payment amount
- FV= Future value
- P/Y= Number of payment periods per year
- C/Y= Number of compoundings per year
- PMT: Select END for an ordinary annuity, BEGIN for an annuity due.

Note: For loans, the loan amount will be the present value (PV) of the annuity. Money that is paid out should be entered as negatives.

To exit, press 2nd QUIT.

19. Effective yield

To calculate effective yield of an investment press 2nd FINANCE, then arrow down to select C:→ EFF (nominal rate, number of compoundings), then enter. For example an investment paying 8% annually, compounded weekly would have an effective yield of: →EFF (8,52) which is equivalent to 8.23%

20. Matrices

Entering a matrix:

Press MATRX, select EDIT (select on screen by using arrow keys) then press ENTER. Enter the dimensions (# of rows x # of columns) of the matrix, press ENTER. Use arrows to move around matrix, filling in the values in the table. Press 2nd QUIT.

Calculations with matrices:

To insert the matrix name into a calculation, press MATRX, and choose the matrix you want (A-J), press enter.

Matrix operations:

After the matrix has been entered, several matrix operations are available. Press MATRX, then select MATH on screen using the arrow keys, then select the desired operation from the menu using the arrow keys, then press enter (i.e. operation “RREF” will reduce the matrix).

21. **Statistics**

Entering a list of numbers:

Press STAT and select EDIT (from the list), then press enter. Enter your list of numbers in any column of the table **L1-L6** (use arrow keys to navigate through the lists). You may also enter your numbers in one list and the corresponding frequencies in another list.

Finding mean, variance, standard deviation (single variable):

After entering your list Press STAT, select CALC (using arrow keys) from the menu, then select 1-Var Stats, press enter, Press 2nd and select the list **L1-L6**, press ENTER.

Finding area under the normal curve between two values:

If you know the mean and standard deviation of a population, you can approximate the percent of the population between a lower value and an upper value. Starting from your list, press 2nd DISTR select normalcdf, then press enter. The values you must give to the function are as follows: normalcdf (lower value, upper value, mean, standard deviation). Values must be separated by a comma.

Linear regression (curve fitting):

After entering ordered pairs of data points into two lists (**L1-L6**) (see first topic above), press STAT, select CALC from the menu, then select 4:LinReg. Enter your x-list name, a comma, and then your y-list name. [If you want the regression equation to automatically get placed into Y1, enter a comma, press VARS key, arrow right to Y-Vars, hit ENTER, hit ENTER.] Press ENTER; read the slope (a) and y-intercept (b) of line of best fit. Note: If you choose Diagnostic ON from the CATALOG you will also get the coefficient of correlation (r) when you do LinReg.