# Algebra 1 TI-84 Tips & Tricks

- On the TI-84 all the blue functions above keys can be accessed by first clicking the blue $\mathbf{2^{nd}}$ button and green functions above keys can be accessed by first clicking the green **alpha** button
- To make **Exponents** click the **^** (above the **÷** symbol). A shortcut for squaring is the **$x^2$** button above the **log** button on left side of calculator
- $\mathbf{2^{nd}}$ and **mode** to Quit and return to the HomeScreen. Sometimes the **clear** button below the scroll arrows will also work.
- To make an Absolute Value symbol click the green **alpha** button then **window** button. Press **enter**. You should see **| |**
- To make a fraction press **alpha** and the key next to it **x,T,$\boldsymbol{\theta}$,$\boldsymbol{n}$** or press **alpha** then **y=** then press **enter**. This is really useful for reducing fractions (slopes must be reduced before putting into slope-intercept form y=mx+b)

- **Questions with One variable**
  Put the question in $\boldsymbol{y_1}$**=**
  Put each answer one by one in $\boldsymbol{y_2}$**=**
  Check the table $\mathbf{2^{nd}}$ **graph**
  If all the values in the $\boldsymbol{Y_1}$ and $\boldsymbol{Y_2}$ match, the answer is correct

  Example 1:

  4 The expression $-2(x^2 - 2x + 1) + (3x^2 + 3x - 5)$ is equivalent to

  (1) $x^2 + x - 4$ (3) $x^2 + 7x - 4$

  (2) $x^2 - x - 7$ (4) $x^2 + 7x - 7$

- **Finding intersection with graphing**
  Isolate the y by moving all the x's and numbers to other side of equal sign
  Put these equations into $\boldsymbol{y_1}$**=** and $\boldsymbol{y_2}$**=**
  Click $\mathbf{2^{nd}}$ **trace** then chose **5: intersect** and hit **enter**

Use the scrolling arrows to move close to the intersection on **First curve** then click **enter**
Now move close to the intersection on **Second Curve** and click **enter**
Now the calculator says **Guess?** Hit **enter**.
The calculator will say **Intersection** and displays the x and y values

Example 2:

$$2x + 2y = 16$$
$$3x - y = 4$$

Example 3:

$$y = x^2 - 3x - 6$$
$$y = x - 1$$

- **Finding intersection with table**
  Isolate the y by moving all the x's and numbers to other side of equal sign
  Put these equations into $\boldsymbol{y_1}$**=** and $\boldsymbol{y_2}$**=**
  Check the table $\boldsymbol{2^{nd}}$ **graph**
  For whatever value of x, both the $\boldsymbol{Y_1}$ and $\boldsymbol{Y_2}$ match, that will be the answer
  Try it with Example 3 above. When x=-1, the $\boldsymbol{Y_1}$ and $\boldsymbol{Y_2}$ are both -2 so the point (-1,-2) is one intersection. When x=5, the $\boldsymbol{Y_1}$ and $\boldsymbol{Y_2}$ are both 4 so (5,4) is another intersection.

  ***Note****: If two equations have the same number in front of the x (slope) and different y-intersects, they will be parallel so there will be* ***no solution*** *because parallel lines never intersect.*

- **Finding Solutions, Roots, Zeroes, and X-Intercepts**
  Solutions, roots, zeroes, and x-intercepts all mean the same thing: they want you to find where a function crosses the x-axis (where y is zero hence why it is called "zeroes".)
  Isolate the y by moving all the x's and numbers to other side of equal sign
  Put the equation into $\boldsymbol{y_1}$**=**
  Click $\boldsymbol{2^{nd}}$ **trace** then chose **2: zero** and hit **enter**
  Move the cursor to the **left** (above) of the place where it crosses the x-axis **Left Bound** and hit **enter.** Move cursor to the **right** (below), hit

**enter**. Calculator asks **Guess?** Hit **enter.** Below the graph, the display will show the x and y coordinates. ***The Y should be 0.***

Example 4:

Which ordered pair below is *not* a solution to
$f(x) = x^2 - 3x + 4$?
1) $(0, 4)$
2) $(1.5, 1.75)$
3) $(5, 14)$
4) $(-1, 6)$

Example 5:
If $4x^2 - 100 = 0$, the roots of the equation are
1) –25 and 25
2) –25, only
3) –5 and 5
4) –5, only

- **Finding Minimums and Maximums**
  Put the equation into $\boldsymbol{y_1}$**=**
  Click $\boldsymbol{2^{nd}}$ **trace** then choose either **3: minimum** (for lowest point) or **4: maximum** (for highest point) then hit **enter**
  The graph appears, move the cursor **Left Bound**, **enter**, **Right Bound**, **enter.** Calculator asks **Guess?** Hit **enter.** Below the graph, the display will show the x and y coordinates.

  Example 6:

  What is the *minimum* value of the function
  $y = |x + 3| - 2$?
  1) –2
  2) 2
  3) 3
  4) –3

Example 7:

Let $h(t) = -16t^2 + 64t + 80$ represent the height of an object above the ground after $t$ seconds. Determine the number of seconds it takes to achieve its maximum height. Justify your answer.

- **Graphing Inequalities**
  Isolate the y by moving x's and numbers to the right side of the inequality symbol
  Click **apps** button. Scroll down and select **Inequalz** then **enter**
  Click **y=**. Scroll to the left until the box blinks. Hit **enter**.
  Scroll to **Y** use your cursor to find the inequality symbol that matches the equation. Scroll to **OK** and hit **enter**
  **Scroll right** and enter the equation
  **Scroll down** and do the same if there is a second equation
  Select **graph**

  Example 8:

  $$3y + 2x \leq 15$$
  $$y - x > 1$$

  ***Note:*** *To exit the Inequality app, go back to* ***apps,*** *click* ***Inequalz, 2: Quit Inequality Graphing, enter.***

- **Changing Windows in Graphing**
  Sometimes you will be given a question that involves graph that is outside the domain and range on the default graph (x and y both go from -10 to 10.)
  Click on **window**
  **Xmin** enter smallest x value
  **Xmax** enter largest x value
  **Ymin** enter smallest y value
  **Ymax** enter largest y value
  Then **Graph**

Example 9: Graph the following

An Air Force pilot is flying at a cruising altitude of 9000 feet and is forced to eject from her aircraft. The function $h(t) = -16t^2 + 128t + 9000$ models the height, in feet, of the pilot above the ground, where $t$ is the time, in seconds, after she is ejected from the aircraft.

***Note:*** *to reset the graph back to the default click* **zoom, 6, enter**

- **Statistics**
  Click on **stat** then **1: Edit** and **enter**
  You will enter each value under **L1** column and hit enter after each value
  Click on **stat** then Scroll to **Calc** and select **1: 1-Var Stats**
  **List** should have L1 next to it
  **FreqList** should have nothing next to it
  Scroll to **Calculate** and hit **enter**
  $\bar{x}$ is the mean (average)
  $S_x$ is Sample standard deviation
  $\sigma_x$ is Population standard deviation
  **n=** is the number of data points. (Make sure that matches how many were in the question.)
  **minx=** is the smallest value
  $Q_1$ is the lower quartile
  **Med** is the median
  $Q_3$ is the upper quartile
  **maxX** is the highest value

Example 10:

The following table shows the heights, in inches, of the players on the opening-night roster of the 2015-2016 New York Knicks.

| | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 84 | 80 | 87 | 75 | 77 | 79 | 80 | 74 | 76 | 80 | 80 | 82 | 82 |

The population standard deviation of these data is approximately

1) 3.5
2) 13
3) 79.7
4) 80

***Note:*** *To clear the values in the L1 column, scroll up so your cursor is on* ***L1****, hit* ***clear****, scroll down. That should clear all the data points.*

- **Correlation Coefficients**
  ***The correlation coefficient will not appear unless you turn Stat Diagnostics On**
  Click **mode**
  Scroll down to **Stat Diagnostics**
  Scroll to **On** then hit **enter**
  Then **Clear**

  To enter data from a question, go to **stat**, **1: Edit**, **enter**
  Enter all the x values under the **L1** column and the y values under **L2**
  (If you are unsure, time is always an x value.)
  Click on **stat**, scroll to **Calc**. Under **Calc**, scroll down to **4: LinReg (ax+b)**, hit **enter.** You should see **Xlist: L1, YList: L2**, and nothing next to the rest. Scroll down click **Calculate** and **enter**
  The Correlation Coefficient is the **r** value (ignore $\mathbf{r^2}$)

  Example 11:
  The table below shows the amount of money a popular movie earned, in millions of dollars, during its first six weeks in theaters.

| **Week** (x) | 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|---|
| **Dollars Earned, in Millions** (y) | 185 | 150 | 90 | 50 | 25 | 5 |

  Write the linear regression equation for this data set, rounding all values to the *nearest hundredth*.

  State the correlation coefficient to the *nearest hundredth*.

- **Solving systems of equations using The Matrix**
  **2nd** $x^{-1}$ This will take you into the Matrix
  Click on **1** and scroll to **Edit**
  Put in the number of rows x columns then **Enter**
  (2x3 if you have 2 equations with 2 unknowns)
  Now you are in the Matrix. Enter each number from the coefficients in the equations, hit enter each time until all the rows and columns are filled
  **2nd Mode** (Quit the Matrix)
  **2nd** $x^{-1}$ to reenter the Matrix
  Scroll to **Math**, then scroll down to B↓**rref(**
  Hit **enter**
  **2nd** $x^{-1}$ to reenter the Matrix
  Select the Matrix you were working on (for example 1**: [A])**
  **Enter**
  Now you will see **rref([A]**
  **Enter**

  You will see a matrix like this one:

  | | | |
  |---|---|---|
  | 1 | 0 | -4 |
  | 0 | 1 | 1 |

  The first row is saying the x=-4 and the second row is saying y=1.

  Example 12:

  $2x + 3y = -5$
  $-4x - 9y = 7$