

# Algebra 2 TI-84 Tips & Tricks

## Under Mode put Calculator in a+bi mode

(The default setting is Real. In Algebra 2 you learned about complex variables and will need to be in **a+bi mode** to do problems where the answers are complex.)

- On the TI-84 all the blue functions above keys can be accessed by first clicking the blue **2<sup>nd</sup>** button and green functions above keys can be accessed by first clicking the green **alpha** button
- To make **Exponents** click the **^** (above the  $\div$  symbol). A shortcut for squaring is the **x<sup>2</sup>** button above the **log** button on left side of calculator
- **2<sup>nd</sup>** 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 | |

- **The Math button**

Located under the green alpha button, it has several important functions you will be using in Algebra 2

**3: 3** will **cube** any number or variable (like  $x^3$  or  $4^3$ )

**4:  $\sqrt[3]{}$**  will take the third root

**5:  $\sqrt{x}$**  allows you to take any root

**0↓ summation  $\Sigma$**  (lets you calculate summations)

**A↓ logBASE** (lets you do logs with bases other than 10)

Scroll right to **NUM**

**1: abs** (is the absolute value symbol)

**9↓ gcd** (helps you find greatest common denominator)

**0↓ remainder** (can tell you the remainder when one number divides into another. Very helpful when calculating the exponent on i)

- **Making a fraction**

To make a fraction press **alpha** and the key next to it **x,T, $\theta$ .n** or press **alpha** then **y=** then press **enter**. This is useful for reducing fractions (slopes must be reduced before putting into slope-intercept form)

$y=mx+b$ ). It is also extremely useful when trying to calculate very complicated equations.

- **Questions with One Variable and an equal sign**

Take each side and put one into  $y_1=$  and the other into  $y_2=$

Then **graph** (if you cannot see the intersection, you may need to adjust the **window**. Instructions for that below)

Click **2<sup>nd</sup> 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 1:**

What is the solution set for x in the equation below?

$$\sqrt{x+1} - 1 = x$$

- 1 {1}
- 2 {0}
- 3 {-1,0}
- 4 {0,1}

- **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**

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

- **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  $y_1=$  and  $y_2=$

Click **2<sup>nd</sup> 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:

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

- **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  $y_1=$  and  $y_2=$

Check the table **2<sup>nd</sup> graph**

For whatever value of x, both the  $Y_1$  and  $Y_2$  match, that will be the answer

Try it with Example 2 above. When  $x=-1$ , the  $Y_1$  and  $Y_2$  are both -2 so the point (-1,-2) is one intersection. When  $x=5$ , the  $Y_1$  and  $Y_2$  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.*

- **Questions with One variable**

Put the question in  $y_1=$

Put each answer one by one in  $y_2=$

Check the table **2<sup>nd</sup> graph**

If all the values in the  $Y_1$  and  $Y_2$  match, the answer is correct.

### Example 3:

When the expression  $(x + 2)^2 + 4(x + 2) + 3$  is rewritten as the product of two binomials, the result is

- 1  $(x + 3)(x + 1)$
- 2  $(x + 5)(x + 3)$
- 3  $(x + 2)(x + 2)$
- 4  $(x + 6)(x + 1)$

You can also check your factoring using this method. Put the question in  $y_1=$ . In  $y_2=$  enter what you got when you factored.

Check the table **2<sup>nd</sup> graph**

If all the values in the  $Y_1$  and  $Y_2$  match, the answer is correct

- **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  $y_1=$

Click **2<sup>nd</sup> 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:

The zeros for  $f(x) = x^4 - 4x^3 - 9x^2 + 36x$  are

- 1  $\{0, \pm 3, 4\}$
- 2  $\{0, 3, 4\}$
- 3  $\{0, \pm 3, -4\}$
- 4  $\{0, 3, -4\}$

- **Finding Solutions using PlySmlt2**

Make sure your polynomials has all terms on the left of the = sign and 0 to the right of the = sign.

Select option 1. Select the degree and a+bi mode. Click Next (graph button). Enter the coefficients and constant then select Solve (graph button). Try it with Example 4 above and Example 5 below.

Example 5:

Find the roots of the function  $y=3x^2 + 16x - 35$

- **Finding Minimums and Maximums**

Put the equation into  $y_1=$

Click **2<sup>nd</sup> 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

- **Solving systems of equations using App PlySmly2**

Choose option 2 Simultaneous Eqn Solver

If you have 2 equations and 2 unknowns, just click the button under Next in the far-right corner of screen (graph button).

If you are solving 3 equations and 3 unknowns, change Equations and Unknowns to 3 then click Next (graph button)

Make sure your equations are in order (alphabetical order x then y then z followed by = sign and a number). You will now enter all the coefficients and constant in order from left to right hitting enter each

time. For the coefficients, you will need to enter and scroll to the next space to enter.

Once all are filled in, click Solve (graph button). You should see the results of the variables.

Example 7:

$$2x + 3y = -5$$

$$-4x - 9y = 7$$

- **Using y= to Help with Common Bases**

In Algebra 2, you will be expected to know perfect squares. If you do not know them all, go to **y=** and enter  $x^2$  then **2<sup>nd</sup> graph**. You will see a table. In the **Y column** are the perfect squares. In the **X column** are the numbers you get when you square the perfect square.

You are also expected to know the values of base 2, 3, 4, 5, 6, 7 etc. If you do not know for example that  $2^4$  is 16, you can go to **y=** enter **2<sup>x</sup>** then **2<sup>nd</sup> graph**. In the table you would scroll down the x's until you see 4, next to it in the **Y column** is 16. You can use this method to find bases of by entering  $3^x$ , bases of 4 by entering  $4^x$ , etc.

- **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 8:

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

3) 79.7

2) 13

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 **0** ↓ **ExpReg**,

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 **r<sup>2</sup>**)

### Example 9:

A cup of coffee is left out on a countertop to cool. The table below represents the temperature,  $F(t)$ , in degrees Fahrenheit, of the coffee after it is left out for  $t$  minutes.

$t$	0	5	10	15	20	25
$F(t)$	180	144	120	104	93.3	86.2

Based on these data, write an exponential regression equation,  $F(t)$ , to model the temperature of the coffee. Round all values to the *nearest thousandth*.

- **Normal Distribution**

You will be asked to find the percent of a sample or population with certain information provided (mean, standard deviation, range of values)

Click **2<sup>nd</sup>** and **vars** (right under the scroll arrows)

Choose **2: normalcdf** (

Enter the values for **lower:**, **upper:**,  $\mu$ : (which is the symbol for mean), and  $\sigma$ : (which is the symbol for standard deviation)

Scroll to **Paste** and hit **enter**

The calculator should give you a decimal between 0 and 1

If the question asks for a percent, you will need to multiply by 100 to convert a decimal to a percent

### Example 10:

The heights of women in the United States are normally distributed with a mean of 64 inches and a standard deviation of 2.75 inches. The percent of women whose heights are between 64 and 69.5 inches, to the *nearest whole percent*, is

- 1 6
- 2 48
- 3 68
- 4 95

### Other useful APPS

**Periodic** – shows you the Periodic Table

**SciTools**-Sig-Fig Calculator and Unit Converter