



TI-83 Plus Transformation Graphing

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Where to Find Installation Instructions

You can find detailed instructions on installing Flash applications at education.ti.com/guides.

What is Transformation Graphing?

Transformation Graphing lets you observe the effects of changing coefficient values without leaving the graph screen. Transformation Graphing affects only function graphing. **X** is the independent variable and **Y** is the dependent variable. It is not available in parametric, polar, or sequence graphing.

Transformation Graphing allows you to manipulate up to four coefficients on the graph: **A**, **B**, **C**, and **D**. Any other coefficients act like constants, using the value in memory.

If you have the demo version

The Transformation Graphing demo version is fully functional. The only limitation is that the **Y=** expression must be $Y1=AX^2+BX+C$. All features can be explored completely. You may follow the Getting Started and the Activity in this manual without special adjustments.

Getting Started: Exploring $=AX^2+BX+C$

Explore the Function $Y=AX^2+BX+C$ for Increasing Values of A and B.

1. Press $\boxed{\text{APPS}}$. If you do not see **Transfrm** (or **DemoTrns**) as an option, you need to download the Transformation Graphing application on your TI-83 Plus.

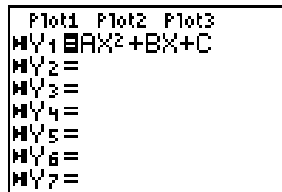


2. Select **Transfrm**. The Transformation Graphing screen appears. Press any key (except $\boxed{2\text{nd}}$ or $\boxed{\text{ALPHA}}$).



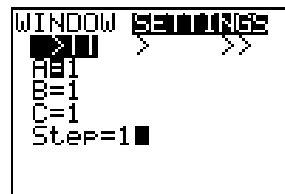
(If you do not see this screen, but see a menu instead, then Transformation Graphing is already active; select **2:Continue**.)

3. In Func mode, press $\boxed{Y=}$ to display the **Y=** editor. Press $\boxed{\text{ALPHA}}$ **A** $\boxed{X,T,\theta,n}$ $\boxed{x^2}$ $\boxed{+}$ $\boxed{\text{ALPHA}}$ **B** $\boxed{X,T,\theta,n}$ $\boxed{+}$ $\boxed{\text{ALPHA}}$ **C** to enter the expression $Y=AX^2+BX+C$.



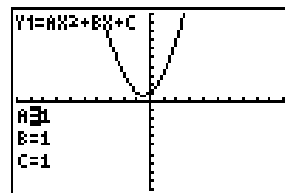
4. If the Transformation Graphing play type to the left of the Y_n function does not look like \gg , press \leftarrow until the cursor is over the symbol, and then press ENTER until the correct symbol appears. This selects Play-Pause as the Transformation Graphing play type.

5. Press WINDOW \uparrow to display the **SETTINGS** screen. \gg on the second line reflects the Transformation Graphing play type you selected on the $Y=$ screen.

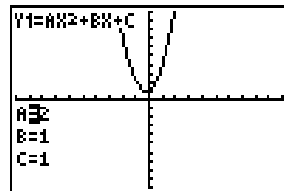


Press \downarrow 1 \downarrow 1 \downarrow 1 \downarrow 1 to define the starting values for the coefficients and the increment by which you want to observe the changing coefficients.

6. Press ZOOM 6 to select **6:ZStandard**. The graph screen is displayed automatically. The selected $Y=$ function and the current values of the coefficients **A**, **B**, and **C** are shown on the screen.

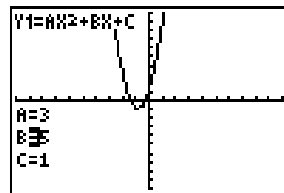


7. Press \blacktriangleright to increment the value of **A** by the **Step** value (1) from 1 to 2. The graph is redrawn automatically, showing the effect of increasing the coefficient of **X** by 1.



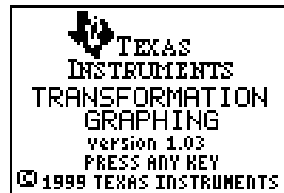
If the coefficient **A** is not selected, press \blacktriangleright until the = sign for **A** is highlighted.

8. Press \blacktriangledown to highlight the = sign for **B**. Press \blacktriangleright several times (pausing briefly each time as the graph is redrawn) to observe the effect of increasing the value of **B**.



Installing Transformation Graphing

1. Press **APPS**.
2. Select **Transfrm** (or **DemoTrns**).
3. If the information screen is displayed, Transformation Graphing has been activated. Press any key except **2nd** or **ALPHA**.



If the TRANSFRM APP screen is displayed, Transformation Graphing is already active. Select **2:Continue**.



Note **Uninstall** does not delete the Transformation Graphing application, it only deactivates it.

Uninstalling Transformation Graphing

1. Press **[APPS]**.
2. Select **Transform** (or **DemoTrns**).
3. If the TRANSFRM APP screen is displayed, Transformation Graphing is active. Select **1:Uninstall** to deactivate Transformation Graphing.



If the information screen is displayed, Transformation Graphing was not active, but has been activated. Press any key except **[2nd]** or **[ALPHA]**, and then return to step 1.



Note | **Uninstall** does not delete the Transformation Graphing application, it only deactivates it. |

Transformation Graphing Play Types

There are three Transformation Graphing play types, which may be set independently for each function.

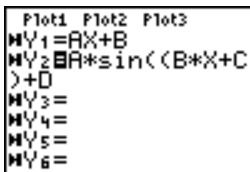
- Play-Pause (>||) lets you control which coefficient is changed and when the graph is plotted.
- Play (>) stores a series of changes as pictures to be displayed like a slide show. The pictures are displayed in a continuous loop until you stop them.
- Play-Fast (>>) stores a series of changes as pictures to be displayed like a slide show. The pictures are displayed in a continuous loop until you stop them. It displays the pictures at a more rapid rate than Play (>).

Play Pause

Selecting Play-Pause

You may select Play-Pause in one of two ways:


- To select the Transformation Graphing play type on the **Y=** screen, press \leftarrow until the cursor is over the symbol at the left of the Y_n function. Press $\boxed{\text{ENTER}}$ until the correct symbol appears.



```
Plot1 Plot2 Plot3
Y1=AX+B
Y2=Asin(BX+C
)+D
Y3=
Y4=
Y5=
Y6=
```

Y_2 is set for Play-Pause.

- To select Play-Pause on the **SETTINGS** screen, press $\boxed{\text{WINDOW}}$ \uparrow to display the **SETTINGS** screen. Press \leftarrow until the cursor is over \gg , and then press $\boxed{\text{ENTER}}$.



```
WINDOW SETTINGS
> >> >>
A=1
B=1
C=0
D=0
Step=1
```

The selected function is set for Play-Pause.

Note

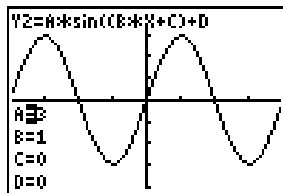
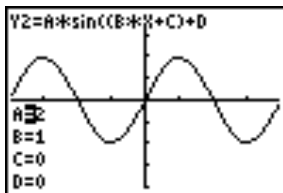
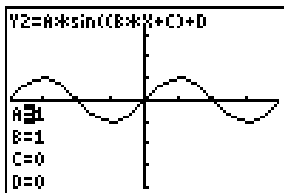
Changing the Transformation Graphing play type on the **SETTINGS** screen affects only the currently selected function.

Setting Coefficient Starting Values and Step

To set values for the coefficients, press \square and enter each value. The value for **Step** is used to increment the selected coefficient on the graph screen each time you press \square or decrement it each time you press \square .

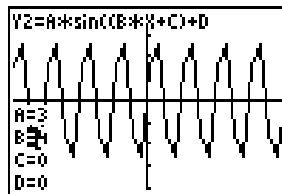
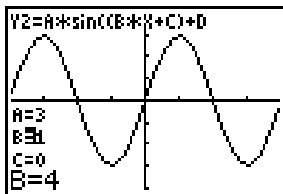
Viewing a Graph with Play-Pause

1. Press \square (or \square and select a menu option). The graph is displayed immediately.
2. Press \square or \square to change to value of the selected coefficient.



3. Press \square or \square to select a different coefficient.

4. To see the effect of a specific value for a coefficient, simply select the coefficient, enter in the value, and press **ENTER**.



Play and Play-Fast

Selecting Play or Play-Fast

You may select Play or Play-Fast in one of two ways:

- To select the Transformation Graphing play type on the **Y=** screen, press \leftarrow until the cursor is over the symbol at the left of the Y_n function. Press $\boxed{\text{ENTER}}$ until the correct symbol appears (\triangleright for Play; \gg for Play-Fast).

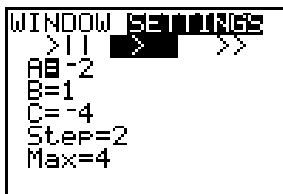
```
Plot1 Plot2 Plot3
M1Y1=AX+B
M1Y2=A*sin((B*X+C
)+D
M1Y3=BX^2+BX+C
M1Y4=
M1Y5=
M1Y6=
```

Y3 is set for Play.

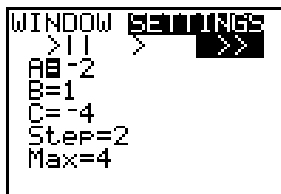
```
Plot1 Plot2 Plot3
M1Y1=AX+B
M1Y2=A*sin((B*X+C
)+D
M1Y3=BX^2+BX+C
M1Y4=
M1Y5=
M1Y6=
```

Y3 is set for Play-Fast.

- To select Play or Play-Fast on the **SETTINGS** screen, press **WINDOW** \uparrow to display the **SETTINGS** screen. Press \leftarrow or \rightarrow until the cursor is over $>$ (Play) or $>>$ (Play-Fast), and then press **ENTER**.



The selected function is set for Play.



The selected function is set for Play-Fast

Note Changing the Transformation Graphing play type on the **SETTINGS** screen affects only the currently selected function.

Setting Coefficient Starting Values, Max, and Step

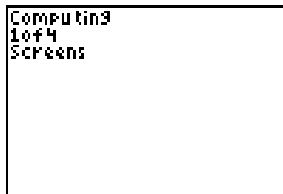
To set values for the coefficients, press \downarrow and enter each value. The value for **Step** is used to increment the selected coefficient between screens in the slide show.

The **Max** value is not displayed for Play-Pause, but is displayed whenever Play or Play-Fast is selected. **Max** and **Step** determine how many screens must be calculated between screens in the slide show. You may have up to 13 screens in Play or Play-Fast, depending on the amount of available RAM (about 10K is required for 13 screens).

If you receive a **MEMORY** error message, you must either reduce the value of **Max**, increase the initial value of the selected coefficient, or increase the value of **Step** (assuming positive values of **Max** and **Step**).

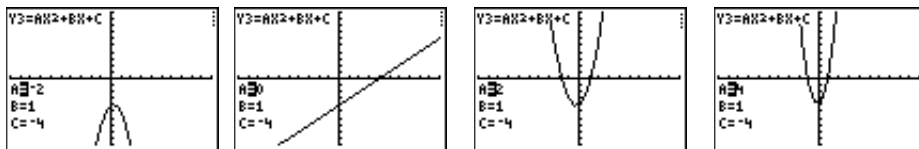
Viewing a Graph with Play or Play-Fast

Press **GRAPH** or **ZOOM** and one of the zoom commands (**ZDecimal**, **ZSquare**, **ZStandard**, **ZTrig**, **ZInteger**, or **ZoomStat**). You will see a message as the screens are plotted and stored.



```
Computing  
1 of 4  
Screens
```


Once the screens have been plotted, they are displayed in a continuous loop until you stop them.



Pausing the Slide Show

To pause the slide show, press **ENTER**. Press **ENTER** again to resume it.

Leaving the Slide Show



You may leave the slide show in one of two ways:

- Press **ENTER** to pause the slide show. Then press the key you want twice. (The **SETTINGS** screen is always displayed first.)
- Press and hold **ON** to leave the slide show and go to the **SETTINGS** screen.

Note All keys except **ENTER** and **ON** are ineffective while the slide show is running. You must press **ENTER** or press and hold **ON** to stop the display.

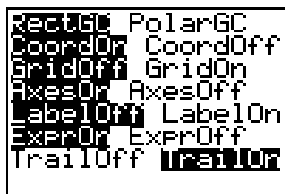
Changing Coefficients

You can control coefficient values in several ways:

- Use the  and  keys to increment and decrement the coefficient by the value specified for **Step** on the **SETTINGS** screen. (Play-Pause)
- Enter in a new value for a coefficient. (Play-Pause)
- Set up the initial and **Step** values on the **SETTINGS** screen. (Play-Pause)
- Set up the initial, **Max**, and **Step** values on the **SETTINGS** screen. (Play and Play-Fast)

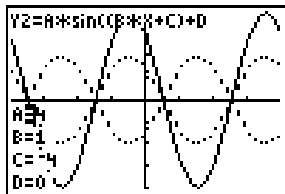
TrailOff and TrailOn

The Graph Format screen has an extra setting: **TrailOff** or **TrailOn**.



The default setting, **TrailOff**, is the same as normal function graphing.

TrailOn lets you see the effect of changing the value of a coefficient by leaving a dotted shadow of the previous graphs.



When you select a different coefficient (**A**, **B**, **C**, or **D**) or cause the graph to replot, the shadow disappears.

Transformation Graphing and Normal Function Graphing

Transformation Graphing allows the same commands and activities as normal function graphing. However, only one function may be selected at a time, which affects actions and parameters in some cases. Some actions are not applicable in Play or Play-Fast.

Language

Transformation Graphing automatically recognizes if one of the following languages is installed and displays the prompts and menus in that language: Danish, Dutch, English (default), Finnish, French, German, Italian, Norwegian, Portuguese, Spanish, or Swedish.

Defining a Function

[\(Chapter 3 in TI-83 Plus manual\)](#)

Functions are defined on the $Y=$ screen. There are no differences except in graph styles and selecting a function. (See below for details.)

Transformation Graphing allows up to four coefficients, **A–D**. Any other coefficients act like constants.

You may define up to 10 functions in Transformation Graphing, but only one function may be selected at a time.

Graphing a Family of Curves

[\(Chapter 3 in TI-83 Plus manual\)](#)

Although only one function can be selected, you can use lists in function definitions to graph a family of curves (although graphing will be slower).

Selecting and Deselecting a Function

[\(Chapter 3 in TI-83 Plus manual\)](#)

Only one function may be selected at a time. In the **Y=** editor, when you select a different function, the currently selected function is automatically deselected.

FnOff may be used to deselect the selected function in Transformation Graphing. **FnOn** does not automatically deselect the selected function, so it works in Transformation Graphing (with one argument) only if preceded by **FnOff**.

Graph Styles and Connected and Dot Mode

[\(Chapters 1 and 3 in TI-83 Plus manual\)](#)

The graph style icons on the **Y=** screen are not available in Transformation Graphing mode. However, you may still select **Connected** or **Dot** mode on the **MODE** screen.

You cannot change the Transformation Graphing play type with the **GraphStyle** command.

Window Variables and Zoom Commands

[\(Chapter 3 in TI-83 Plus manual\)](#)

You may define the viewing window in Transformation Graphing on the **WINDOW** screen, using a **ZOOM** command, or from the Home screen or a program.

When you install Transformation Graphing, **Xres** is set to **3** to improve graphing speed. Likewise, **Xres=3** when you select **ZStandard** in Transformation Graphing. You may set **Xres** to **1** or **2** on the **WINDOW** screen if you need better resolution.

Note

After using **ZBox**, **Zoom In**, or **Zoom Out**, press **GRAPH** to redisplay the coefficients.

Free-moving Cursor

[\(Chapter 3 in TI-83 Plus manual\)](#)

The free-moving cursor is not available in Transformation Graphing because \leftarrow , \rightarrow , \uparrow , and \downarrow are used to increment coefficient values and move between coefficients. (If the selected function does not use the coefficients **A**, **B**, **C**, or **D**, then the free-moving cursor is available.)

Tracing a Function

[\(Chapter 3 in TI-83 Plus manual\)](#)

You can trace a function in Play-Pause. When you press $\boxed{\text{TRACE}}$, the coefficient values disappear and the values for **X** and **Y** are displayed. To return to incrementing coefficients, press $\boxed{\text{GRAPH}}$.

Panning works in Transformation Graphing. Because only one function can be selected in Transformation Graphing, the \downarrow and \uparrow keys are not needed unless a stat plot is selected.

Pressing $\boxed{\text{ENTER}}$ during Trace in Transformation Graphing causes the graph to center on the current location.

Format Settings and TrailOn

[\(Chapter 3 in TI-83 Plus manual\)](#)

Format settings, which define a graph's appearance on the display, work the same in Transformation Graphing as in normal function graphing. However, Transformation Graphing has an extra format option: **TrailOn**.



Tables

[\(Chapter 7 in TI-83 Plus manual\)](#)

Because only one function can be selected on the **Y=** screen, a table can display only one column of Y values when Transformation Graphing is active.

DRAW Instructions

[\(Chapter 8 in TI-83 Plus manual\)](#)

You can draw on a graph in Play-Pause, but when you press  or  to increment a coefficient, the graph is recalculated and the drawing is erased. You cannot draw on a graph in Play or Play-Fast.

Saving a Graph for Later Use

[\(Chapter 8 in TI-83 Plus manual\)](#)

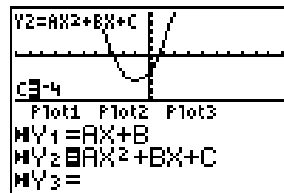
When you store a graph database in Transformation Graphing, the **Y=** functions and which function is selected are saved, but the Transformation Graphing play type and the setting values are not.

Split Screen

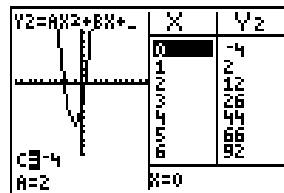
[\(Chapter 9 in TI-83 Plus manual\)](#)

Split screen is available, but because of space limitations, not all coefficients are displayed.

In **Horiz** mode only the selected coefficient is displayed. To switch the selected coefficient, press \square . The newly-selected coefficient is displayed.



In **G-T** mode only two coefficients are displayed. To switch the selected coefficient, press \square . The newly-selected coefficient is displayed at the top of list.



Stat Plots

[\(Chapter 12 in TI-83 Plus manual\)](#)

Stat Plots may be used in all three Transformation Graphing play types (see the Activity).

Activity: Exploring a Stat Plot with Transformation Graphing

These readings were obtained during a lab experiment. Find the coefficients for $Y=AX^2+BX+C$ that best fit the data.

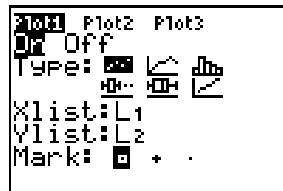
x	y
0.0	0.5
1.0	4.0
1.5	6.0
2.0	8.0
4.0	8.0
4.5	6.0
5.0	5.0
6.0	0.5

1. Press **[STAT]**. Select **1:Edit....** Enter the values from experiment into the stat editor.

L1	L2	L3	Z
1.5			
2.0			
4.5			
5.0			

L2(9) =			

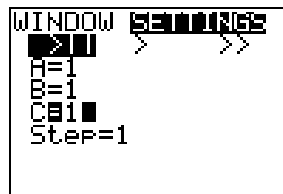
2. Press $\boxed{2\text{nd}}$ $\boxed{[STAT PLOT]}$. Select **1:Plot1**. Turn the plot on and set the **Type**, **Xlist**, **Ylist**, and **Mark** as shown.



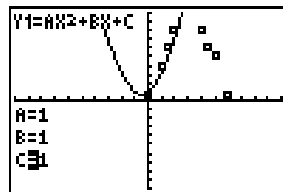
3. Press $\boxed{Y=}$ to display the Y= editor. Enter $Y1=AX^2+BX+C$ for the equation.



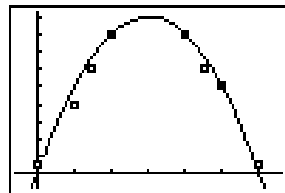
4. Press \boxed{WINDOW} $\boxed{\uparrow}$ to display the **SETTINGS** screen. Set the values as shown.



5. Press \boxed{ZOOM} $\boxed{6}$ to select **6:ZStandard**.



6. Change the coefficient values to fit the curve to the data points.



Hint

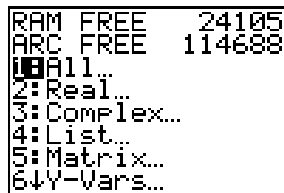
Once the curve is fairly close to the data points, press **ZOOM 9** to select **9:ZoomStat**.

Deleting Transformation Graphing from the TI-83 Plus

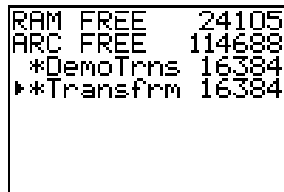
You may have more than one Flash application on the TI-83 Plus at one time. When you need more space, you may remove an application and download it again later from a PC or another TI-83 Plus.

To remove the Transformation Graphing Application from the calculator, follow the procedure for deleting any application from archive memory:

1. Press **2nd** **[MEM]** **2:Mem Mgmt/Del...** to display the amount of RAM and ARC space available.
2. Select **A:Apps....**
3. Move the **▶** indicator to ***Transfrm** (or **DemoTrns**).
4. Press **[DEL]**.

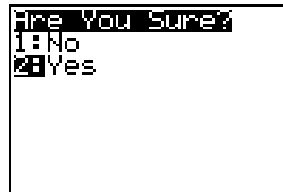


RAM FREE 24105
ARC FREE 114688
▶ All...
2: Real...
3: Complex...
4: List...
5: Matrix...
6: Y-Vars...



RAM FREE 24105
ARC FREE 114688
*DemoTrns 16384
▶ *Transfrm 16384

5. Select **2:Yes** when asked **Are You Sure?**



Note

The **Uninstall** option on the APPS Transfrm menu does not delete the Transformation Graphing application, it only deactivates it.

Error Recovery Instructions

Low Battery Condition

Do not attempt a Flash download if the low-battery message appears on the calculator. Low battery indication is shown on the initial screen. If you receive this error during an installation, change the batteries before trying again.

Check Amount of Flash Application Free Space

On the TI-83 Plus, press **2nd** [MEM], and then select **2:Mem Mgmt/Del....** Each application requires at least 16,535 bytes of **ARC FREE**.

Archive Full

This download error appears when the TI-83 Plus does not have sufficient memory for the application. In order to make room for another application, you must delete an application and/or archived variables from the TI-83 Plus. Before deleting an application from the TI-83 Plus, you can back it up using the **Link > Receive Flash Software** command in TI-GRAPH LINK™ for the TI-83 Plus. Once saved, you can reload it to the TI-83 Plus later using TI-GRAPH LINK.

Communication Error

This error indicates the Flash Installer is unable to communicate with the TI-83 Plus. The problem is usually associated with the TI-GRAPH LINK cable and its connection to the TI-83 Plus and/or to the computer. Make sure the cable is firmly pushed into the calculator and the computer.

If this does not correct the problem, try a different TI-GRAPH LINK cable and reboot your computer. If you continue to get this error, please contact [TI-CARES](#).

Validation Error

Electrical interference caused a link to fail or this calculator is not authorized to run the application.

Miscellaneous Errors

See pages B-6 through B-10 in the TI-83 Plus manual (education.ti.com/guides) for information about the specific error or contact [TI-CARES](#).

Miscellaneous

If you obtain new or upgraded software for your TI-83 Plus, you may need to provide your current software version and/or the serial number of your unit. It is also good to know your version number in case you have difficulties with your TI-83 Plus and need to contact technical support. Knowing the software version may make it easier to diagnose the problem.

Verify Maintenance Upgrade Version and Serial Number

On the TI-83 Plus, press $\boxed{2\text{nd}}$ $\boxed{[\text{MEM}]}$, and then select **1:About**. The version number has the format x.yy. The serial number appears on the line beneath the product ID number.

Verify Flash Application Version

On the TI-83 Plus, press $\boxed{[\text{APPS}]}$. Select the appropriate application and press $\boxed{[\text{ENTER}]}$. The version number of the application appears on the initial screen.

Texas Instruments (TI) Support and Service Information

For general information

E-mail: ti-cares@ti.com

Phone: 1-800-TI-CARES (1-800-842-2737)
For US, Canada, Mexico, Puerto Rico, and
Virgin Islands only

Home page: education.ti.com

For technical questions

Phone: 1-972-917-8324

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