# Using the Transformation Graphing APP on the TI-84

1. After turning your calculator on, open the Transformation Graphing App.   Use the key sequence below to skip through the menu.
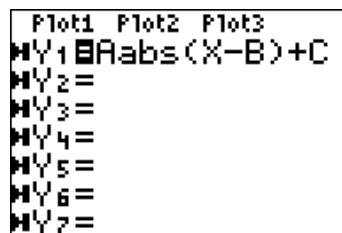
APPS   ALPHA   4   [T]   ▼   ▼   (:Transfrm)

ENTER   ENTER   Y=

Notice the icon the left of Y1 has changed. This indicates that   you in the **Transformation Graphing APP**, not on the Equation Editor.

```
Plot1  Plot2  Plot3
▶Y1=■
▶Y2=
▶Y3=
▶Y4=
▶Y5=
▶Y6=
▶Y7=
```
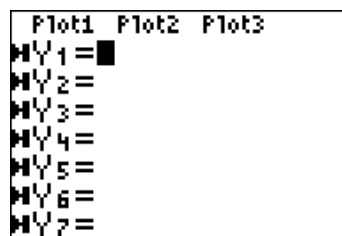
2. Use the key sequence below to store the equation Y= A|x – B| +C in Y1. This is the "Parent Function."

ALPHA   MATH [A]   MATH ▶   <NUM> (1:abs)

ENTER   X,T,Θ,*n*   –   ALPHA   APPS [B]

)   +   ALPHA   PRGM [C]   ENTER

```
Plot1  Plot2  Plot3
▶Y1▤Aabs(X−B)+C
▶Y2=
▶Y3=
▶Y4=
▶Y5=
▶Y6=
▶Y7=
```
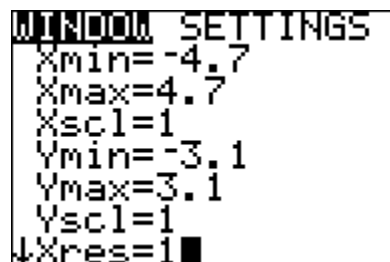
3. Set the FORMAT as shown in the screen shot. Use the key sequence below.

2nd   ZOOM <FORMAT>   ▼   ▼   ▶   (Grid On)

ENTER   2nd   MODE [QUIT]

```
RectGC PolarGC
CoordOn CoordOff
GridOff GridOn
AxesOn AxesOff
LabelOff LabelOn
ExprOn ExprOff
```

4. Set the WINDOW. Use the key sequence below to set the parameters shown in the screen shot.

WINDOW   (-)   4   .   7   ENTER   4

.   7   ENTER   1   ENTER   (-)   3

.   1   ENTER   3   .   1   ENTER

1   ENTER   1   2nd   MODE [QUIT]

```
WINDOW SETTINGS
Xmin=-4.7
Xmax=4.7
Xscl=1
Ymin=-3.1
Ymax=3.1
Yscl=1
↓Xres=1■
```
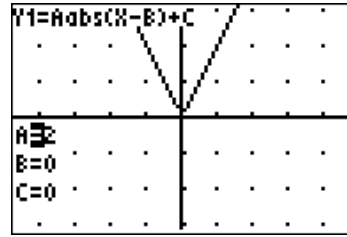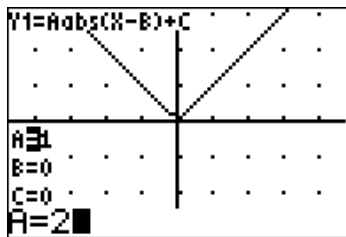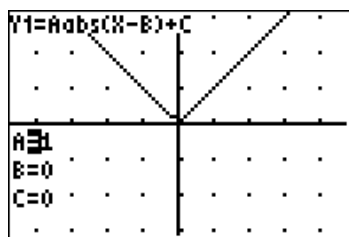
5. The SETTINGS screen allows you make any designate the variable and speed for the functions in the Transformation Graphing App.

Press   WINDOW   ▲   to see the SETTINGS screen.

```
WINDOW SETTINGS
       >      >>
A=1
B=0
C=0
Step=1
```
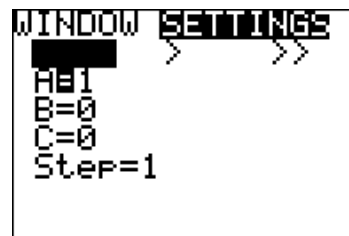
A. The Play-Pause mode **(>||)** is the default speed for the Transformational Graphing App. Select it by pressing ENTER .

B. Adjust the "SETTINGS" for the function so that A = 1, B = 0, C = 0, and Step = 1, as shown in the screen shot above. Press ▼ [1] ENTER [0] ENTER [0] ENTER [1] 2nd   MODE [QUIT] . This defines the starting values for the coefficients and the increment by which you want to change the coefficients as shown in the screenshot. They represent the coefficients for the "Parent Function."

C. Highlight the **"="** sign for A to make it the dynamic variable. Use the arrows to place the cursor on the **"="** sign and press   ENTER   .

6. Press GRAPH . The highlighted variable is dynamic. Play-Pause mode **(>||)** allows for control of the animation of the graph using the ▶ and ◀ arrow keys by increasing or decreasing the value of the highlighted variable by the designated step. Alternatively, you can type in a desired value for a variable followed by ENTER as shown in the screen shots below.

```
Y1=Aabs(X-B)+C          Y1=Aabs(X-B)+C          Y1=Aabs(X-B)+C


A=1                     A=1                     A=2
B=0                     B=0                     B=0
C=0                     C=0                     C=0
                        A=2■
```

Graph of Parent Function

A. What do you notice about the behavior of the parent function when as the value of A changes?

B. Set A = 1. Make B the dynamic variable. What do you notice about the behavior of the parent function as the value of B changes?

C. Set A = 1 and B = 0. Make C the dynamic variable. What do you notice about the behavior of the parent function as the value of C changes?

7. To return to the SETTINGS Screen, press WINDOW ▲ .

8. On the SETTINGS Screen, if you choose either of the AutoPlay icons, **(>)** for slow, or **(>>)** for fast, the graph becomes dynamic automatically. As shown in the screen below, the TI-84 will automatically make four graphs for A= 1, 2, 3, and 4, which is the maximum value for A.

```
WINDOW SETTINGS
  >||            >>
 A=1
 B=0
 C=0
 Step=1
 Max=4
```
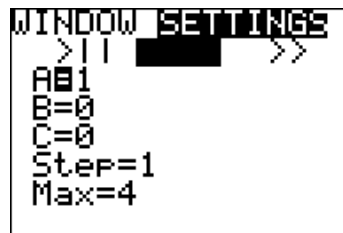
After designating the settings, press GRAPH . The TI-84 computes the screens that show the function changing dynamically. To pause the graph, press ENTER . To reactivate it, press ENTER again. To stop the graph, press ON, which returns the you to the SETTINGS Screen.

9. To deactivate the Transformations Graphing APP, press

APPS   ALPHA   4   [T]   ▼   ▼   (:Transfrm)   ENTER

   A. Then press ▼   ▼ (:Transfrm)   ENTER

```
APPLICATIONS
↑Tabla P
 :TestGrd2
 :Transfrm
```

   B. Select (1:Uninstall) by pressing ENTER.

```
TRANSFRM APP
1:Uninstall
2:Continue
```

Exploration Questions for the Absolute Value Family

   A. Some students think that the absolute function could be called the "rebound" function. What do you think this means? Do you agree?

   B. How can you predict whether the graph of the equation will open upward or downward?

   C. If A= -1, describe the geometric transformation of the Parent Function.

   D. Summarize how changing the value of A affects the graph of the function.

E. What happens to the graph of the function as the value of |A| increases?

F. Summarize how changing the value of B affects the graph of the function.

G. Summarize how changing the value of C affects the graph of the function.

H. What are the coordinates of the point where the function "rebounds?"

I. How can you determine the slope of each "branch" of the function?

J. What is the domain?

K. What is the range?

L. Can the range be determined from the equation? Explain!

M. What is the equation of the function that is graphed?
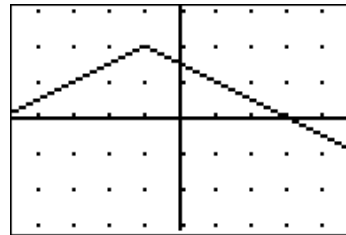
N. Write the equation of an Absolute Value Function whose domain all real numbers, whose range is $y \leq 2$, with a vertex in 1st Quadrant and is **narrower than** $Y = |x|$.