

# Investigating Absolute Value Functions with the *fx-9750G*

## PLUS

### A Pre-Algebra Activity

The graphing calculator gives students the opportunity to discover many of the properties of absolute value functions on their own.

Begin by showing them some of the things that the calculator will do with absolute value. From the MENU select LIST. If there are values in Lists 1 & 2, highlight List 1, press F4 (DEL-A) to delete the list values. Repeat for List 2. Enter the values 0,1,2,3,4,-1,-2,-3,-4 into List 1. Highlight List 2 and press OPTN, F4 (NUM), F1 (Abs), OPTN, F1 (LIST), F1 (List), 1. This will put the corresponding absolute values of each number in List 1 into List 2.

	List 1	List 2	List 3	List 4
1	0			
2	1			
3	2			
4	3			
5	4			
6	-1			
7	-2			
8	-3			
9	-4			
10				

Abs List 1  
List L→M Dim Fill Seq

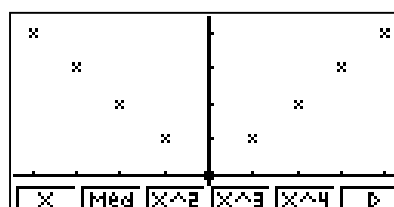
	List 1	List 2	List 3	List 4
1	0	0		
2	1	1		
3	2	2		
4	3	3		
5	4	4		
6	-1	1		
7	-2	2		
8	-3	3		
9	-4	4		
10				

List L→M Dim Fill Seq

To plot these points, press MENU, STAT, F1 (GRPH), F6 (SET), F1 (GPH1). Highlight Graph, press F1 (Scat) to choose a scatter plot; highlight Xlist, press F1 (List 1); highlight Ylist, press F2 (List 2); highlight Frequency, press F1 (1), highlight Mark Type, press any of the choices you like. Press EXE, F1 (GPH1) to view the points.

StatGraph1	
Graph Type	:Scatter
XList	:List1
YList	:List2
Frequency	:1
Mark Type	:*

GPH1 GPH2 GPH3

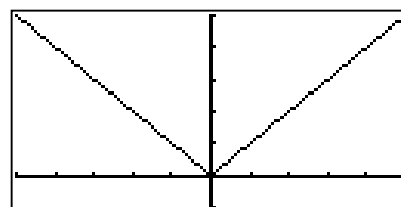


Next we will graph some absolute functions and see what interesting things we can discover. From the MENU select GRAPH. If there is anything other than Graph Func :Y= on the first line, press F3 (TYPE), F1 (Y = ). If there are any functions already listed highlight them and press F2 (DEL) and then F1 (YES) one at a time. On the Y1= line, enter Abs X by pressing OPTN, F5 (NUM), F1 (Abs), X. This is a good opportunity to discuss domain and range with your students. Ask them for suggestions for the view window and encourage them to try different ones. To choose an appropriate view

window, press SHIFT, F3 (V-Window). Highlight Xmin and enter -5. In a like manner, enter 5 for Xmax, 1 for scale, -1 for Ymin, 5 for Ymax and 1 for scale. Press EXE to return to the Y= screen and press F6 (DRAW) to draw the graph.

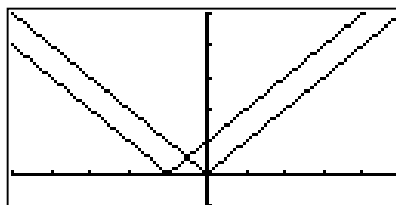
```
View Window
Xmin :-5
max :5
scale:1
Ymin :-1
max :5
scale:1
INIT TRIG STD STO RCL
```

```
Graph Func :Y=
Y1|Abs X
Y2|
Y3|
Y4|
Y5|
Y6|
SEL DEL TYPE AMEM DRAW
```



Leave the Abs X in Y1= . Ask students to predict what  $Y2 = \text{Abs}(X+1)$  would look like. Have them enter it the same way they did the first one and draw the graph.

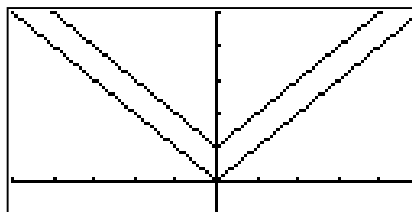
```
Graph Func :Y=
Y1|Abs X
Y2|Abs (X+1)
Y3|
Y4|
Y5|
Y6|
SEL DEL TYPE AMEM DRAW
```



Ask them to name the vertex in the first graph (0,0) and in the second graph (-1,0). Ask them to try to graph an absolute value equation with a vertex at (3,0). Let them experiment with several of those and ask them to write a sentence about what they had learned.

Have them delete all equations except the first one. This time ask them to enter  $Y2 = \text{Abs} X+1$  (without parentheses). Have them predict what the graph will look like before they draw the graph. For each suggestion, have them explain their reasoning. After they draw the graph, ask them to try to enter an absolute value equation of a graph that would have a vertex at (0,-2) Let them experiment with several of those and ask them to write a sentence about what they had learned.

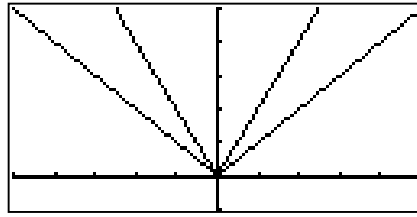
```
Graph Func :Y=
Y1|Abs X
Y2|Abs X+1
Y3|
Y4|
Y5|
Y6|
SEL DEL TYPE AMEM DRAW
```



Challenge them to enter an absolute value equation that would have a vertex at (-2, -4). Let them experiment with several of those and ask them to write a sentence about what they had learned.

Have them delete all equations except the first one. This time ask them to enter  $Y_2=2\text{Abs } X$ . Have them predict what the graph will look like before they draw it. For each suggestion, have them explain their reasoning.

```
Graph Func :Y=  
Y1|Abs X  
Y2|2Abs X  
Y3|  
Y4|  
Y5|  
Y6|  
SEL DEL TYPE ZMEM DRAW
```



Ask students to write absolute value equations that would be very narrow and then some that would open wide. Let them experiment with several of those and ask them to write a sentence about what they have learned about the general equation  $Y = a \text{ Abs } (X+b) + c$ .