


TI-83/84 How To Series

Topic: Viewing Graphs on the Calculator using the Window Function

One of the difficulties and ultimately frustrations students have with graphing a set of data or a line using the calculator is being unable to see the graph either properly or sometimes at all. This is a direct result of not understanding how the TI calculator is set up to view a graph. In particular it is the WINDOW function the student has difficulty with.

While there are shortcuts within the TI-83/84 to view the data, it is important the student understands how to set up the WINDOW because this will help in an overall understanding of graphing, either on the calculator or pencil to paper.

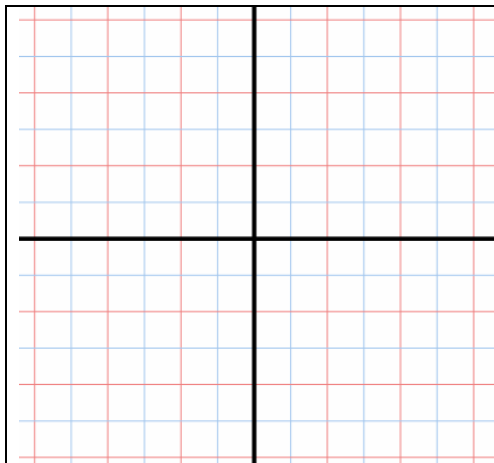
How the WINDOW is Set Up

After hitting  on the TI-83/84 you will see a screen similar to this.

```
WINDOW
Xmin=-10
Xmax=10
Xscl=1
Ymin=-10
Ymax=10
Yscl=1
Xres=1
```

These are the default values the TI-83/84 assigns each category. Do not be intimidated by this screen. All of the categories can be represented by a graph you would normally see or draw your self.

Let's take a typical x-y graph.



Depending on your data, you may or may not use all of the graph. The key is to use as little as the graph as possible while maximizing the information from the data given.

In order to do this you will need a plan.

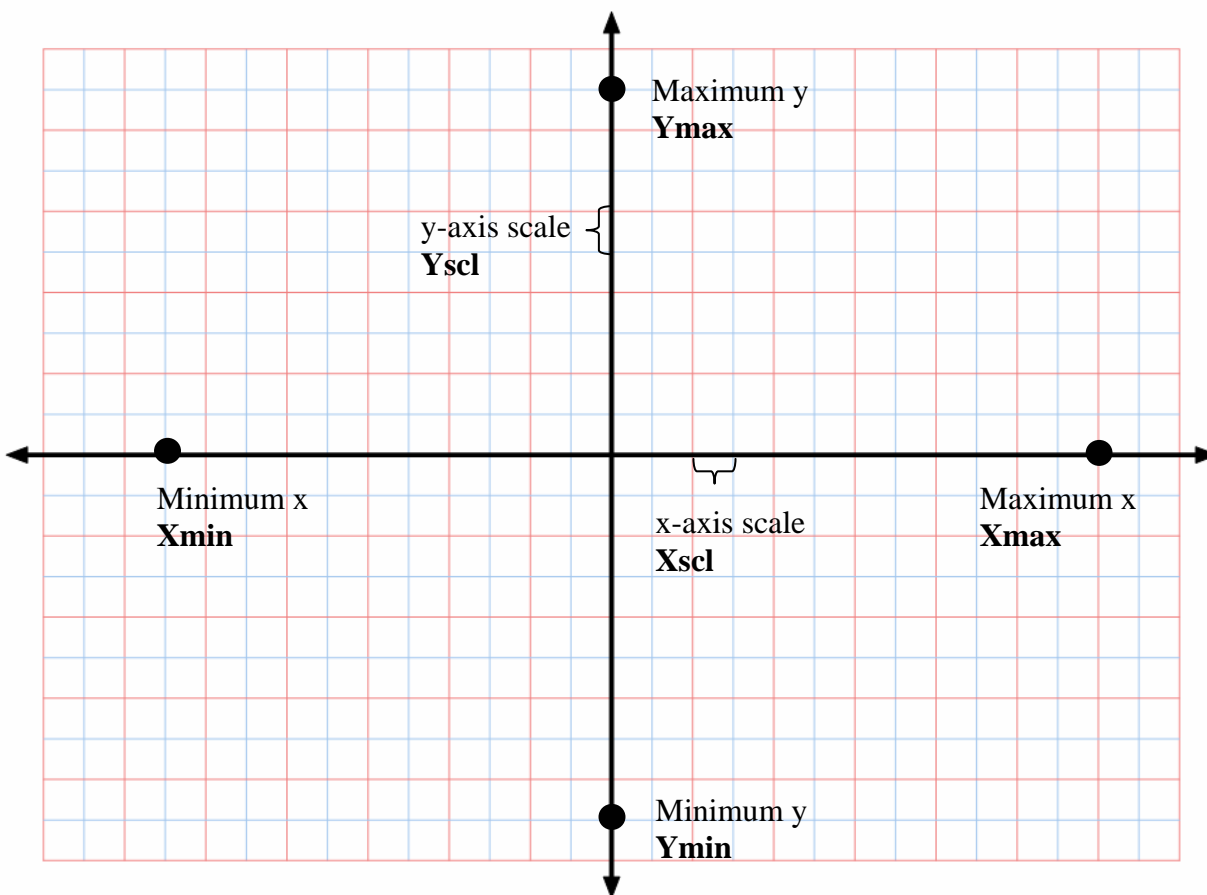
Formulating a Plan

When baking a cake you do not just start adding ingredients in any amount you wish. If you want a cake that both looks and tastes good, you follow a recipe. The recipe is the plan for baking your cake. The same concept follows when drawing a graph. You do not just start plotting out the points without making some kind of plan or else you may end up with a graph too small or a graph too big.

The **data** and ultimately the questions associated with the data dictates how you should set up your graph.

Steps

1. Look at your x-values, what is the smallest and the largest values. These values will help you determine how to set up your x-axis both in terms of where to start and stop (min and max) and the scale as well. Now look at your y-values. Again, these values will help you set up your y-axis. Let's see how these values affect a typical graph and what the corresponding categories are on the TI-83/84 WINDOW screen (**in bold**).

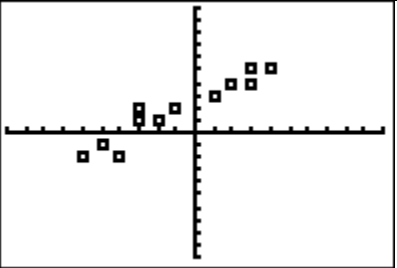


Based on your set of data, the minimum and maximum values of both x and y will vary. Sometimes you will not require negative numbers, other times you will. Let's take a look at some examples:

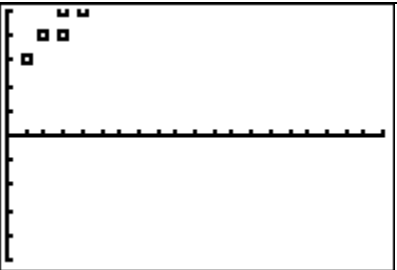
Example Data Set 1:

X	Y
-6	-2
-5	-1
-4	-2
-2	1
-3	1
-3	2
-1	2
1	3
2	4
3	4
3	5
4	5

The minimum x = -6, maximum x = 4, minimum y = -2 and maximum y = 5 suggests that a window should be set as

<pre>WINDOW Xmin=-10 Xmax=10 Xscl=1 Ymin=-10 Ymax=10 Yscl=1 Xres=1</pre>		<p>In this case we do not need to adjust the properties of the Window from its default. However, notice how the window has been set lower than both the minimums and higher than both maximums. All points can be seen and the user can see how the data behaves without any difficulty.</p>
<p>This is a good plot</p>		

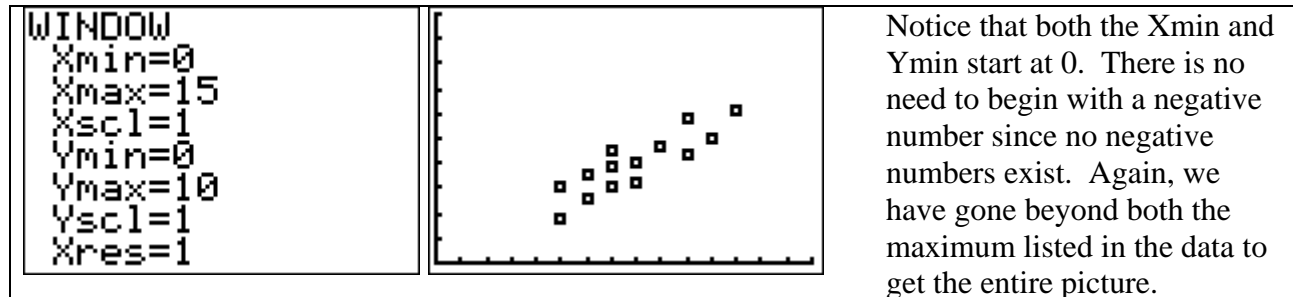
Let's change the properties of the window and see how the plots compare.

<pre>WINDOW Xmin=0 Xmax=20 Xscl=1 Ymin=-5 Ymax=5 Yscl=1 Xres=1</pre>		<p>With the window set up in this way, we are unable to see half of the data and therefore the user will not be able to get the full picture of how the data behaves.</p>
<p>This is a bad plot</p>		

Example Data Set 2:

X	Y
5	3
8	4
6	2.5
7	4.5
11	5
10	5.8
5	1.8
7	3.8
10	4.3
6	3.6
8	3.2
7	3.1
9	4.7
12	6.1

The minimum $x = 5$, maximum $x = 12$, minimum $y = 1.8$ and maximum $y = 6.1$ suggests that a window should be set as

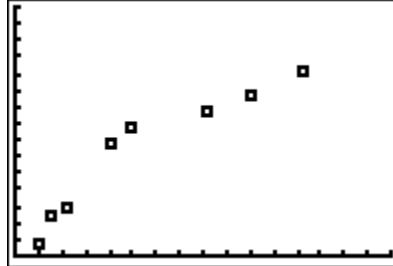


Example Data Set 3

X	Y
25	8
38	24
56	30
101	68
124	77
205	86
250	96
308	111

The minimum $x = 25$, maximum $x = 308$, minimum $y = 8$ and maximum $y = 111$ suggests that a window should be set as

```
WINDOW
Xmin=0
Xmax=400
Xscl=25
Ymin=0
Ymax=150
Yscl=10
Xres=1
```



In this example what is important is the scale. Notice Xscl is set to 25. If the scale was set to one, the calculator would be overwhelmed from trying to plot such a small scale. Think in terms of how you would plot the data on paper. You probably would not want to make your x scale 1, it would take you a long time labeling your axis. The Yscl is set to 10 to correspond to its data set. If you feel more comfortable making both the x and y scales the same (10 or 25) feel free to do this.

Ultimately the objective for setting up your window correctly is to be able to view the data as clearly as possible. Learning this skill is essential when dealing with different types of data.