What is the Best Window? TI-84 Tips for Algebra 1

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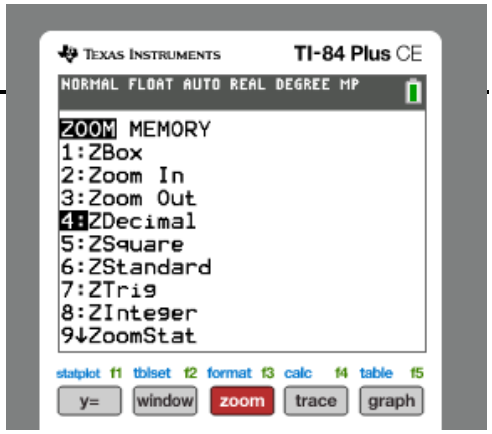
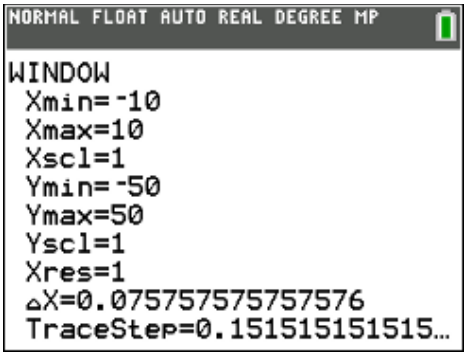


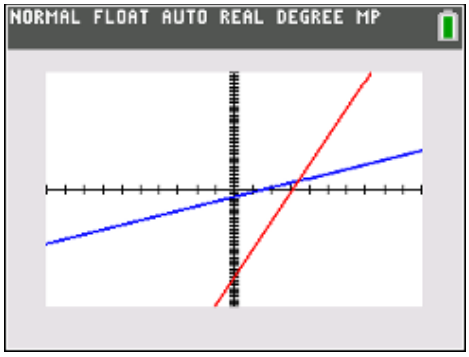
When you graph a function on the TI-84 Plus CE graphing calculator*, you have many built-in choices for the viewing window. Don't leave it to chance… get acquainted with the options so you choose the best window for the graphing job!

What's My Window?

Begin by checking out the ***Window*** button to see how it describes a graphing window. **Xmin**, **Xmax**, **Ymin**, and **Ymax** set the boundary values for the axes, and **Xscl** and **Yscl** give the distance between the tick marks on each axis. Each of these can be set so that your graphing window is suitable for your needs, showing the important features of a function or the complete data set of a scatterplot

When my students are going to graph a function or scatterplot, I start by asking them "What is an appropriate window?" so they plan ahead before pressing ***Graph***. The line y = 2x – 3 will display fully on a standard window, but what about y = 12x – 37 ? My students know to change **Ymin** and **Ymax** to see more of this graph, but if they forget to adjust the scaling on the Y-axis, their graph might look like the one below with an unreadable Y-axis. Instead, set **Yscl** = 5 or 10 to be able to estimate the Y-intercepts.

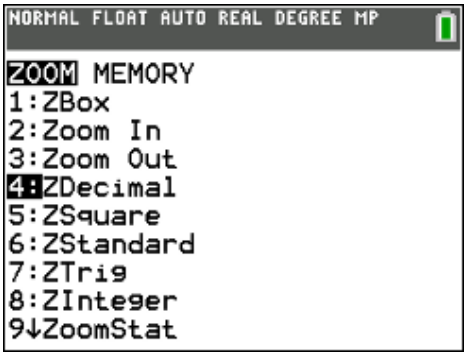


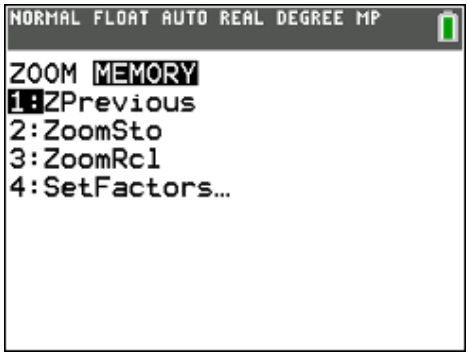


Some Standard Windows

The **Standard** window (item 6 in the ***Zoom*** menu) is a great place to start for many Algebra 1 graphs, since it covers -10 to 10 for both axes. And **Quadrant1** works well when a graphing situation requires only positive values; it is item A in the ***Zoom*** menu, found by scrolling down to the second screen.

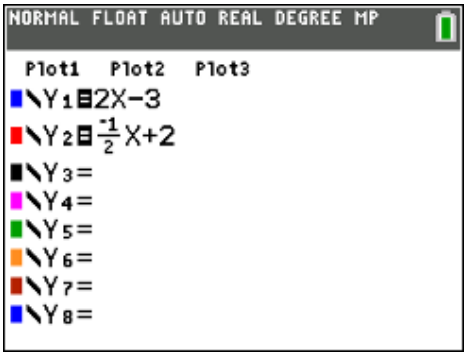
You might notice there is another menu available under the ***Zoom*** key; use the right arrow to go to the **MEMORY** submenu. I use **Zprevious** to return to the previous window if my changes didn't work out the way I expected. And if there is a custom window I want to use again, I can store it and recall it later.

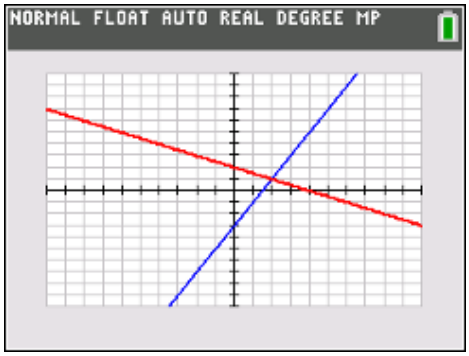




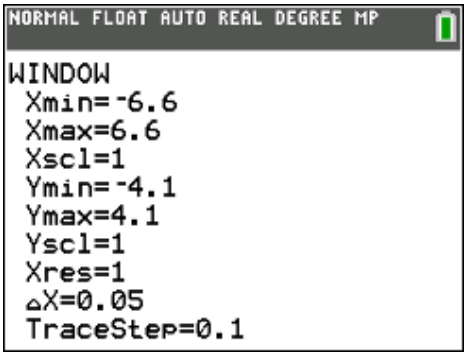
Square Windows

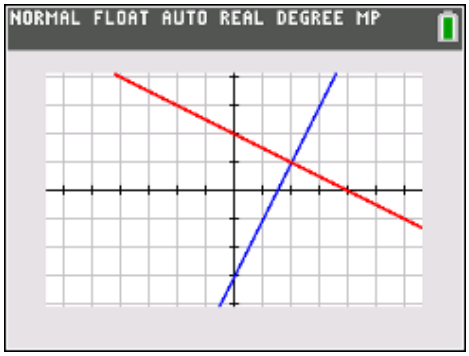
The downside of the Standard and Quadrant1 windows is that the spacing of the scales on the X and Y axes are not equal. The easiest way to see this is to turn on the **GridLine** option by pressing ***2nd Window*** for the **Format** menu. What do you notice about the graph? The gridlines create rectangles, not squares, and this distortion can be confusing for students studying perpendicular lines, for example, since they don't appear to be perpendicular in this viewing window.





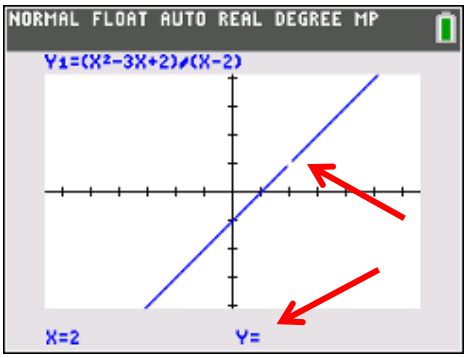
The solution is to select a "square window" in which the axis tick mark spacing is the same for the X and Y axes. Two choices are **ZSquare** which adjusts your current window so the spacing is equalized; and **ZDecimal** , a particular square window that I use all the time (below). These are items 5 and 4 in the ***Zoom*** menu.

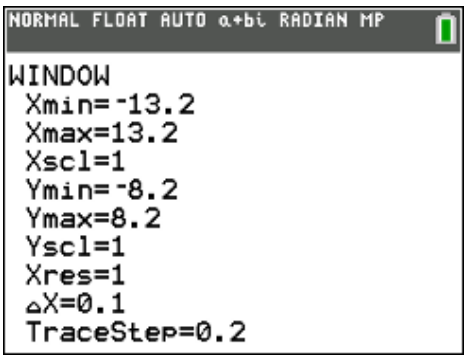


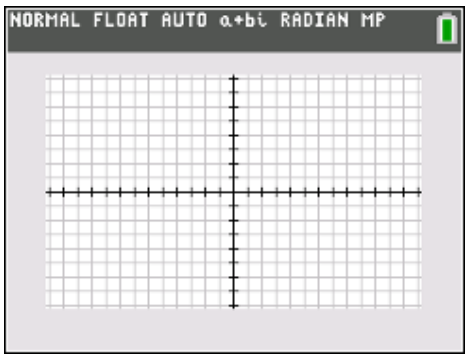


The **Decimal** window is my favorite! It has a reasonable domain and range to use for many Algebra 1 graphs and there is no skew distortion. The ***Trace*** operation uses the very friendly increment of 0.1 for the x-values so the displayed values don't have lots of decimal digits (notice the **TraceStep** value in the ***Window*** screen). With the gridlines showing, my Algebra 1 students can clearly visualize the slope of a line and count "rise" boxes and "run" boxes.

Another wonderful situation for using the **Decimal** window is to display a function that has a hole. This rational function (below left) clearly has a visible hole at x = 2, and notice that the ***Trace*** command shows no value for Y because it is undefined. If your function's hole is out of the screen's range, adjust **Ymin** and **Ymax** while keeping the domain as is.







If the **Decimal** window doesn't show enough of a domain and range for the graphing situation, try a "double-decimal" window by multiplying the min/max values by 2 (above middle & right). Then use **ZoomSto** and **ZoomRcl** to access it when needed.

Zoom Fit and Zoom Stat

These two items in the ***Zoom*** menu help users quickly arrange the window to display the important points of a graph or scatterplot. **ZStat** (item 9 in the ***Zoom*** menu) creates an appropriate window for data in the current stat lists, a time-saving feature. I still require students to decide on a good domain and range for a given data set before using **ZStat**, because it is an important skill for statistical literacy.

ZFit (item 0 in the ***Zoom*** menu) fits the range to the selected domain: it adjusts **Ymin** and **Ymax** to display all Y–values generated by the selected **Xmin** and **Xmax.** For example, the graph of $y = -3x^2 – 10x +15$ on the Decimal window doesn't display either the vertex or y-intercept. Using **ZFit** allows students to see the whole graph at once; they can check the ***Window*** for accurate interpretation of domain and range, and access the **calc** menu (***2nd Trace***) to analyze key points.

One last tip as you embark on your graphing adventure: you can press the ***On*** button to cancel a graph if you don't want it to finish, or press ***Enter*** to pause and restart a graph. Happy graphing!

*If you use a grayscale model of the TI-84 Plus family, you will notice some domain and range differences due to screen pixel density. All of the viewing windows discussed in this post are options for the entire TI-84 Plus product line.