



Topic Areas

- Functions and their Graphs
- Moving between Visual and Symbolic representations of functions

Objectives

- To provide “low stakes” practice in recognizing functions by their graphs
- To describe a function with an equation, given its graph

Match My Graph

Introduction

“Match My Graph” represents an entire category of simple but high-impact uses of the TI-Navigator™ Activity Center. This broad category can be tuned to your needs with various configuration options. For this reason, we describe a particular instance in some detail here, but we also provide an account of some of the possible variations and their pedagogical impact.

By varying the classroom structure of the activity (for example, by having students work in small groups, or by increasing or decreasing the amount of private experimentation and verification that students can do before submitting their work), you can adjust the level of these activities to fit the needs and dynamics of your classes.

Prerequisites and Materials


Prerequisites: Prerequisites vary for “Match My Graph” activities, but these activities generally assume some introduction to the basic graphing skills that will be exercised in the activity. Other network activities may be more appropriate as these skills are being first learned.

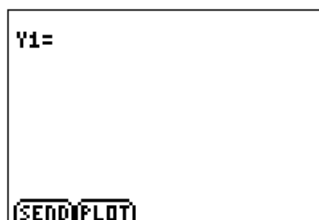
Materials: The Activity Settings file, `MatchMyGraph.act` located on the CD.

Setting Up the Activity

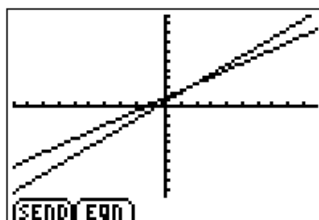
From the TI-Navigator teacher computer home screen, open the Activity Center, . Then choose **File>Load>Load Activity Settings** to load the activity settings file, `MatchMyGraph.act`.


You may also wish to pre-load one or more graphs that will serve as the “target” functions for the activity. Or if you want to gauge students’ comfort or proficiency levels before deciding which functions you will use as the target functions, you can do this during class, blocking the projector while you type in the equations. Either way, however, you should be sure to choose **View>Mask Teacher Input** under the Activity Center to hide the target before projecting or starting the activity.


When you are ready, choose **Equations** from the **Contribute** drop-down box, and start the activity, . Once the students select “Activity Center” their calculator screen will appear as follows.



Because the Activity Center is configured to allow students to preview, they can enter an equation and press **PLOT** to compare its graph with your target. For example, if your target is $Y=(.75)X+1$ and a student enters $Y=X+(0.5)$ and presses **PLOT**, she would see:



As the class works toward matching the target function, more and more of the student graphs will “disappear” behind the graph of the target. Many of the most common conceptual errors will manifest themselves in the public space and will be available for discussion. In the case of linear functions, one example would be a sign error in the slope. If your target function has a negative slope, and if you see one or more functions in the public display that have positive slope, you may choose to pause the activity, , and discuss. In that case, do not ask the student who has made the error to identify himself; rather, ask the class what they can tell about that (unidentified) student’s equation. This will give the rest of the class an additional “mystery” function to grapple with, while correcting the student’s conceptual error in a timely but unthreatening manner.

Stop the activity, , when all or most of the students have matched the graph. From there, you can “raise the bar” of difficulty by choosing a more challenging target function.

Variations

To get a sense of what kinds of pedagogical choices you can make in “Match My Graph” activities, press **Configure** when **Equations** is selected in the **Contribute** drop-down box. In the **Configure Calculators for Activity** dialog that pops up, you should select options for each of the following activity aspects. For each aspect, we indicate the Activity Center’s default as well as some of the implications of various choices:

- Number of equations per student (default = 4). The usual choice here for “Match My Graph” will be 1. However, specifying more than 1 or having students work in groups allows for some trial and error.
- Let students view graphs of equations (default = yes). The usual choice here will be yes. If you choose no, you will raise the stakes on the exercise, which can be appropriate in some assessment contexts, to test student skills and measure their confidence. Alternatively, in conjunction with group work, can put appropriate pressure on students to talk out their answers before submitting.
- Let students resubmit equations (default = no). The usual choice here will be yes. Turning off resubmit removes the opportunity to find the solution through educated trial & error.
- Send graph contents as background (default = no). The usual choice here will be yes if **Let students view graphs of equations** is set to yes, or no if that option is set to no. If the graph contents are sent as a background, then students can verify the fit of their guesses to the solution. In this case, the public display will merely indicate the completion of the exercise, since all students should be able to match the graph before sending in their answers.
- Students start with... (default = Empty equations). The usual choice here will be the default. You can, however, send a ‘prototype’ equation down indicating the basic type of the target equation. For example, if you were working with trig functions and the target is $3\sin(2X)+1$ then you could send $\sin(X)$ in Y1 to give the students a starting point. Note, however, that interesting and valuable conversations can occur when you do not choose this. In the above instance, for example, a student might find a match using the cosine function. Comparing that answer with answers using sine can lead to very revealing discussions.

Other Considerations When Running Match My Graph Activities

As the class works towards a target function, watch the pattern of experimentation and convergence toward the target. Are students more immediately comfortable with one or another part of the target function? This can guide your follow-up discussion with the class.

If you see that students are finding the exercise easy, phase in more challenging target functions. On the other hand, if they find it too difficult, pause the activity in progress and use the pattern of responses as the

jumping-off point for a discussion of the characteristics of the target function. For example, if the target were a linear function, discuss the characteristics of the target function and ask about the difference between the target and one or more of the student responses. (If you choose this approach, be sure that student names are not being displayed).