Graph Logarithms

MATH NSPIRED

Activity Overview

In this activity, you will construct a minimized slider in the Graphs application that will allow you to graph the function $\mathbf{f}(x) = \log_{\mathbf{a}} x$ *for* $0 \le \mathbf{a} \le 4$.

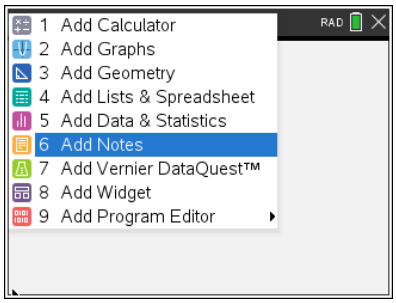
Materials

- *Technology needed (TI-Nspire™ handheld, computer software)*

Steps

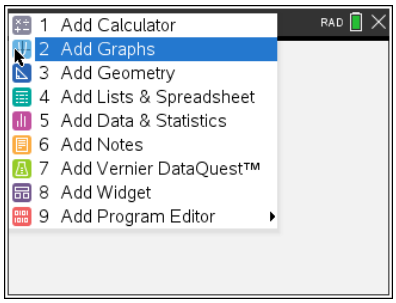
Step 1: Creating a title page

1. *Press* [on] > ***New Doc*** > ***Add Notes.***
2. *Create the title page by typing* ***Graph Logarithms****.*



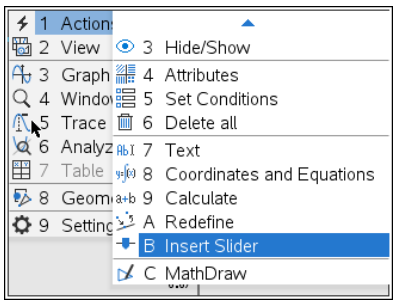
Step 2: Preparing the document

1. *Press* [ctrl] [I] ***> Add Graphs.***

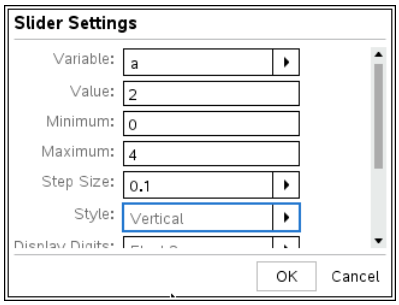


Step 3: Inserting a slider

1. Press **Menu > Actions > Insert Slider.**
2. Move slider to top left corner.
3. Hover your cursor over the slider box and press [ctrl] [menu].

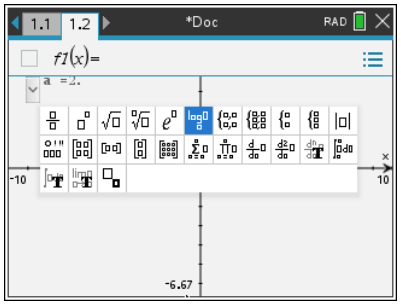


3. Choose **Settings.** Move through the fields by pressing tab. Change the values so that: Variable = *a*, Value =2, Minimum = 0, Maximum = 4, Step Size = 0.1, Style = Vertical, and Display Digits = Fix 2. Click on the check box for minimized.
4. Press enter when complete.

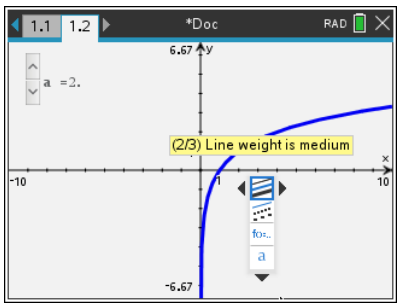


Step 4: Entering the function

1. Press ctrl G to show the function line if necessary or tab to make entry line active.
2. Press .
3. On the top row, choose the expression for logarithm and enter $\log_a x$.
4. Press enter.

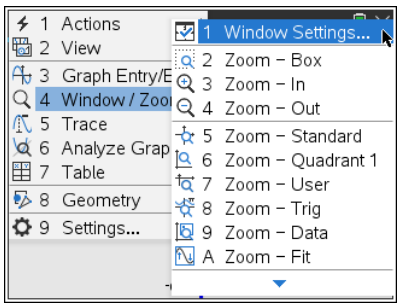


5. Move the cursor to the graph of the function and then press ctrl menu **> Attributes.**
6. Arrow to the right and change the line width of the graph to medium. Press .

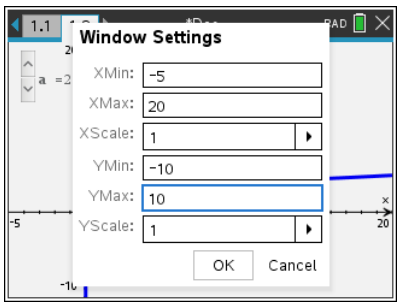


Step 5: Adjusting the window

1. Press **Menu > Window/Zoom > Window Settings.**

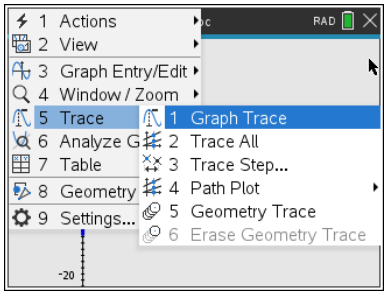


2. Move through the fields by pressing tab. Change the values so that: XMin = –5, XMax = 20, XScale = 1, YMin = –10, YMax = 10, and YScale = 1. Press enter when complete.

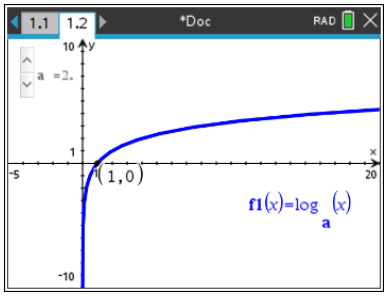


Step 6: Labeling the *x*-intercept

1. Press **Menu > Trace > Graph Trace.**

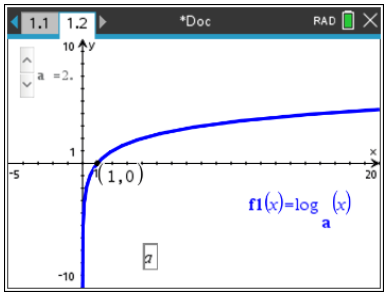


2. Use ◀ or ▶ to move to the point (1, 0) and then press enter. (Note: Before pressing enter, if you are not at that point, you may also press 1 enter, and the cursor will automatically move to that point.)
3. Press esc.

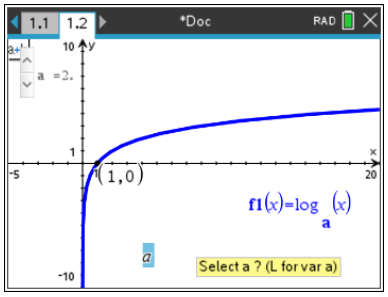


Step 7: Labeling another important point

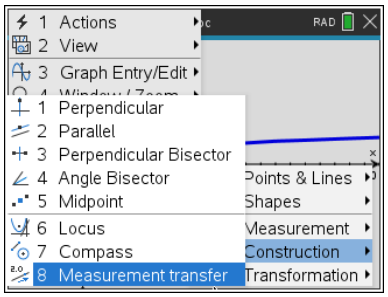
1. Press **Menu > Actions > Text.**
2. Click anywhere in the lower part of the screen.
3. Type *a* in the text box. Press enter. This will be the variable *a.*
4. Press esc.



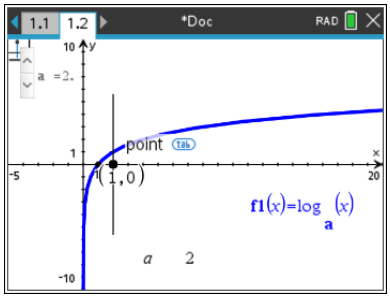
5. Press **Menu > Actions > Calculate.**
6. Select the variable *a* by clicking the letter *a.*
7. Press L to link the variable **a** to the slider a. A faint 2 will appear. Press enter to secure this value to the page.
8. Press esc.



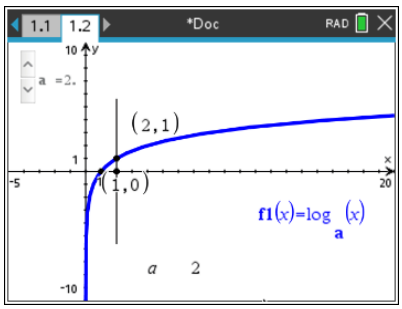
9. Press **Menu > Geometry > Construction > Measurement transfer.**
10. Select the **a**-value, which is currently 2, and then select the *x*-axis. The point (2, 0) should appear.
11. Press esc.



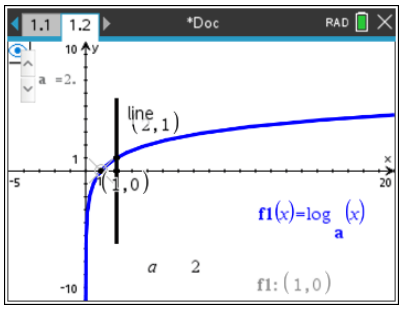
12. Press **Menu > Geometry > Construction > Perpendicular.**
13. Select the point (2, 0) and the *x*-axis.
14. Press esc.



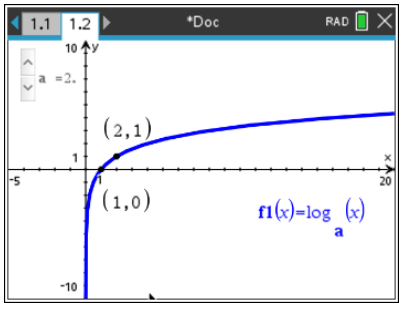
15. Press **Menu > Geometry > Points & Lines > Intersection Point(s).**
16. Select the graph of the function and the perpendicular line. Press P to label the point. (You may have to move the label for point *P* to a convenient location by grabbing it.)
17. Press esc.
18. Press **Menu > Actions > Coordinates and Equations.**
19. Select the point of intersection. This should be the point (2, 1). (Note: You may have to press tab to select the point (2, 1) instead of (2, 0).) Press enter to secure this point to the page.
20. Press esc.



21. Press **Menu > Actions > Hide/Show.**
22. Your cursor will turn to . Use this new cursor to select the perpendicular line, the point (2, 0), the variable *a*, and the value of the variable *a*. This will hide, not delete, these items from the screen. (Note: You may have to press tab to select the point (2, 0) instead of (2, 1).) Exit the **Hide/Show** tool by pressing esc.



23. Your final page should look the one in this figure.



Step 8: Saving the document

1. Press doc ▾ **> File > Save As.**
2. Save in suggested folder and use the file name *Graph_Logarithms.*