



Overview

In this activity, you will build a .tns file that allows you to dynamically examine the rational functions generated by quotients of linear functions.

Materials

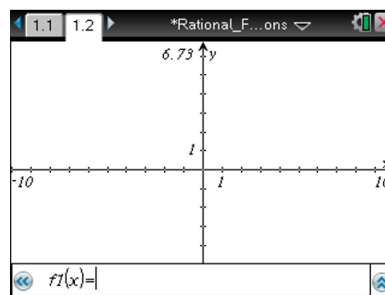
- TI-Nspire™ handheld or computer software

Step 1—Preparing the Document

1. On the TI-Nspire handheld or in the Teacher software, open a new TI-Nspire document.
2. Select Option 6: Add Notes.
3. Type **Rational Functions**.

Note: To obtain capital letters on the handheld, press the **⇧shift** key, then the letter.

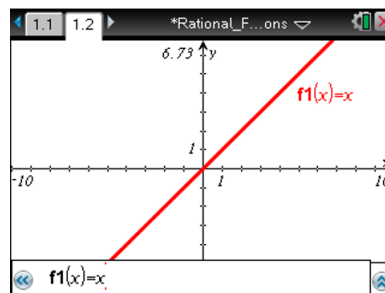
4. Save the file as *Rational_Functions*
5. Add a new page, and select Add Graphs.



Step 2—Adding the Graphs

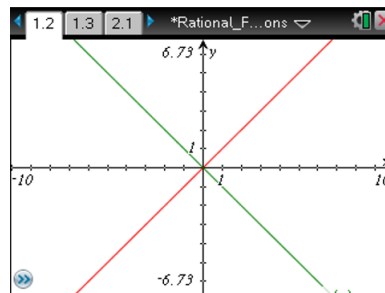
6. In the function entry line, after $f1(x) =$, type x , and press **enter**.

Note: You might need to click **tab** to make the function line to appear.



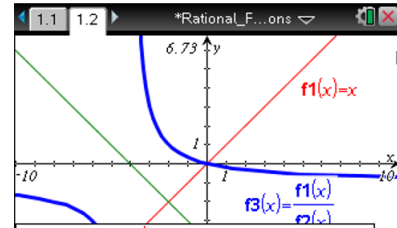
7. In the function entry line, after $f2(x) =$, type $-x$, and press **enter**.

Note: You might need to click **tab** to make the function entry line appear.

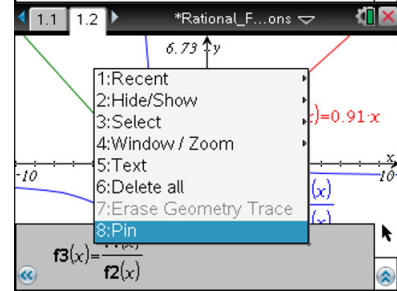




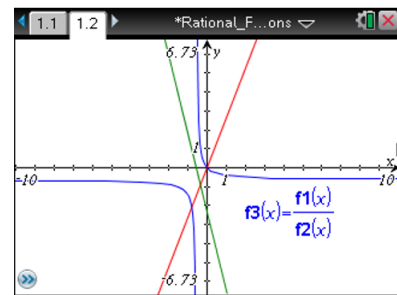
8. In the function entry line, after $f3(x) =$, type $f1(x)/f2(x)$, and press **enter**.



9. Select the background of the graph by right-clicking in the software, or pressing **ctrl enter** on the handheld, and choosing "Pin" to pin the background down.

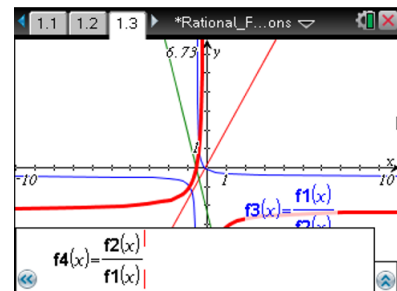


10. You can now rotate or shift $f1$ and $f2$ and observe the corresponding changes in the quotient function, $f3$.



Note: To rotate either of the lines, hover over the line near one of the ends until the symbol appears. Select the line, and use the touchpad or mouse to rotate the line. To shift either of the lines, hover over the line near the center until the symbol appears. Select the line, and use the touchpad or the mouse to drag the line.


11. Copy Page 1.2 to make Page 1.3.
- Using the *computer software*, select Page Sorter from the Documents Toolbox. Right-click on Page 1.2, and select Copy (or use **ctrl+C**). Right-click in the blank space after Page 1.2, and select Paste (or use **ctrl+V**).
 - On the *handheld*, tap **ctrl** to view the document pages. Select Page 1.2. Press **ctrl** **menu** > **Copy**. Select the position for the new (copied) page, and press **ctrl** **menu** > **Paste**.

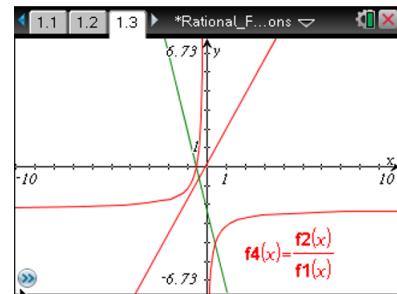


12. In the function entry line, after $f4(x) =$, type $f2(x)/f1(x)$.

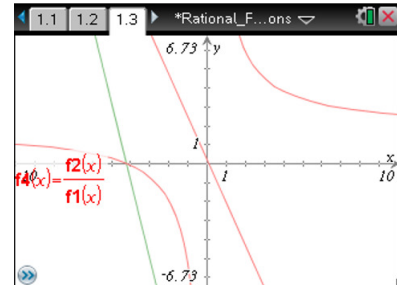


13. Hide the graph of $f_3(x)$.



- Using the *computer software*, right-click on the graph of the function, and select Option 4: Hide. Do the same to hide the function label.
- On the *handheld*, select **MENU > Actions > Hide/Show**. Position the Hide/Show eye  over the graph of $f_3(x)$, and press **enter** to hide $f_3(x)$. Do the same for the function label, if it still appears. Press **esc** to exit Hide/Show mode.

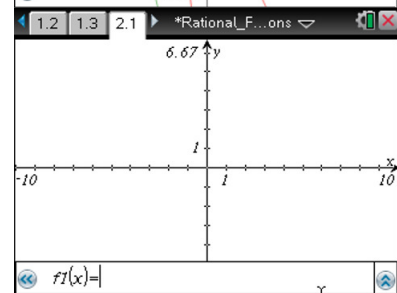


14. You can now rotate and shift f_1 and f_2 and observe the corresponding changes in the quotient function f_4 .



15. If you want to see both quotient functions, show the graph of $f_3(x)$.

- Using the *computer software*, from the Documents Toolbox select **Document Tools > Actions > Hide/Show**. The hidden graph and its label will appear in grey. Hover over the image of the graph and when the pencil symbol  appears, click on the graph to show the function again.
- On the *handheld*, select **MENU > Actions > Hide/Show**. The hidden graph and its label will appear in grey. Hover over the image of the graph and when the pencil symbol  appears, click on the graph to show the function again.





Step 3—Insert a New Problem

16. Insert a new problem.
- Using the *computer software*, select **Insert > Problem > Add Graphs**.
 - On the *handheld*, press **doc**, then select **Insert > Problem**. Then choose Add Graphs.
17. In the function entry line, after $f_1(x) =$, type x . After $f_2(x) =$, type $-x - 4$; and after $f_3(x) =$, type $2x+4$.

18. Expand the function entry line, and after $f_4(x) =$, type $f_1(x)/(f_2(x)f_3(x))$.
19. You can rotate and drag lines f_1 , f_2 , and f_3 to observe the changes in f_4 , or try redefining f_4 to determine the effects of the numerator and denominator on the resulting quotient function.

