

Graphing Technology Lab

Inverse Functions and Relations

You can use TI-Nspire technology to compare a function and its inverse using tables and graphs.

ACTIVITY 1 Graph Inverses with Ordered Pairs

Graph $f(x) = \{(1, 2), (2, 4), (3, 6), (4, 8), (5, 10), (6, 12)\}$ and its inverse.

Step 1 Enter the x -values in column A and the y -values in column B. Then graph the function.

KEYSTROKES: 6: New Document 3: Add Lists & Spreadsheet
 X V A L U E Y V A L U E

Use the arrow keys to move the cursor to cell A1. Then enter the x -values into column A.

KEYSTROKES: 1 2 3 ... 6

Use the arrow keys to move the cursor to cell B1. Then enter the y -values into column B.

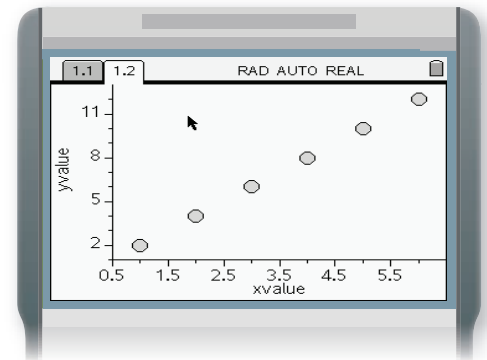
KEYSTROKES: 2 4 6 ... 12

Create a new page and graph the data.

KEYSTROKES: 4: Insert 2: Page 5: Add Data & Statistics. Move the cursor to the bottom center. Hit when it indicates **Click or Enter to change variable**. Select **xvalues**. Move the cursor to the left side center and repeat for **yvalues**.

Adjust the window settings.

KEYSTROKES: 5: Window Zoom 1: Window Settings 0 13 0 13 .



Step 2 Define the inverse function by entering the y -values into column A and the x -values into column B. Enter these values after the existing values.

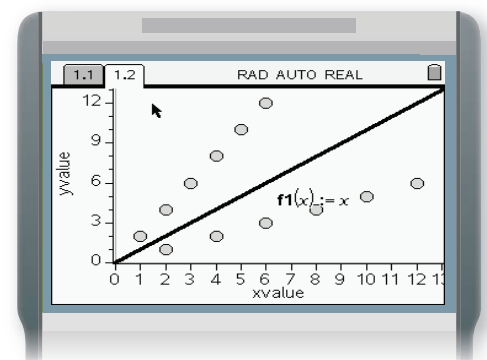
Select the page with the spreadsheet by pressing and using the arrow keys to select the correct thumbnail.

Beginning in cell A7 enter the y -values into column A.

KEYSTROKES: 2 4 6 ... 12

Beginning in cell B7 enter the x -values into column B.

KEYSTROKES: 1 2 3 ... 6



Step 3 Select the page with the graph by pressing and using the arrow keys to select the correct thumbnail. Graph the line $y = x$.

KEYSTROKES: 4: Analyze 4: Plot Function

ACTIVITY 2 Graph Inverses with Function Notation

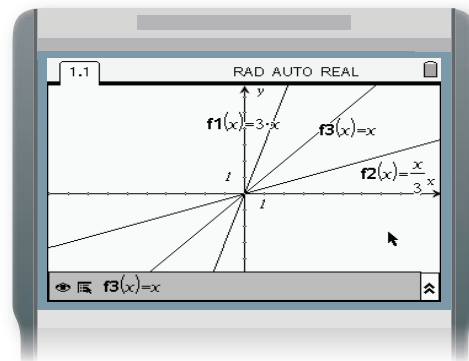
Graph $f(x) = 3x$ and its inverse $g(x) = \frac{x}{3}$.

Step 1 Clear the data from Activity 1.

KEYSTROKES:  6: New Document 2: Add Graphs & Geometry

Step 2 Enter $f(x)$ as $f1(x)$, $g(x)$ as $f2(x)$, and $y = x$ as $f3(x)$. Then graph.

KEYSTROKES: 3   tab   3  tab  



Exercises

Graph each function $f(x)$ and its inverse $g(x)$. Then graph $f \circ g(x)$.

- $f(x) = 5x$
- $f(x) = x - 3$
- $f(x) = 2x + 1$
- $f(x) = \frac{1}{2}x + 3$
- $f(x) = x^2$
- $f(x) = x^2 - 3$
- What is the relationship between the graphs of a function and its inverse?
- MAKE A CONJECTURE** For any function $f(x)$ and its inverse $g(x)$, what is $(f \circ g)(x)$?