

# Graphing Technology Lab

## Inverse Functions and Relations

Casio FX-9750G

You can use a Casio FX-9750G graphing calculator to compare a function and its inverse using tables and graphs. Note that before you enter any values in the calculator, you should clear all lists.

### 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.

Clear the calculator memory first.

Select MEM from the main menu,  $\blacktriangledown$  RESET  $\boxed{\text{F1}}$ .

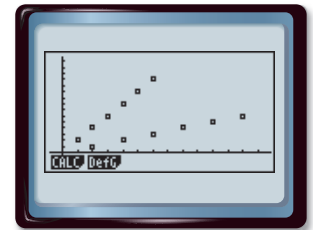
**Step 1** Enter the  $x$ -values in List 1 and the  $y$ -values in List 2. Then graph the function.

KEYSTROKES:  $\boxed{\text{MENU}}$   $\boxed{2}$   $\boxed{1}$   $\boxed{\text{EXE}}$   $\boxed{2}$   $\boxed{\text{EXE}}$   $\boxed{3}$   $\boxed{\text{EXE}}$   $\boxed{4}$   $\boxed{\text{EXE}}$   $\boxed{5}$   $\boxed{\text{EXE}}$   
 $\boxed{6}$   $\boxed{\text{EXE}}$   $\boxed{\blacktriangleright}$   $\boxed{2}$   $\boxed{\text{EXE}}$   $\boxed{4}$   $\boxed{\text{EXE}}$   $\boxed{6}$   $\boxed{\text{EXE}}$   $\boxed{8}$   $\boxed{\text{EXE}}$   $\boxed{10}$   $\boxed{\text{EXE}}$   
 $\boxed{12}$   $\boxed{\text{EXE}}$   $\boxed{\text{F1}}$   $\boxed{\text{F6}}$   $\blacktriangledown$   $\boxed{\text{F1}}$   $\boxed{\text{EXE}}$   $\boxed{\text{F1}}$

The window adjusts automatically to reflect the domain and range.

**Step 2** Define the inverse function by setting Xlist to List 2 and Ylist to List 1. Then graph the inverse function.

KEYSTROKES:  $\boxed{\text{EXIT}}$   $\boxed{\text{F6}}$   $\boxed{\text{F2}}$   $\blacktriangledown$   $\boxed{\text{F1}}$   $\blacktriangledown$   $\boxed{\text{F2}}$   $\blacktriangledown$   $\boxed{\text{F1}}$   $\boxed{\text{EXE}}$   
 $\boxed{\text{F4}}$   $\blacktriangledown$   $\boxed{\text{F1}}$   $\boxed{\text{EXE}}$



### ACTIVITY 2 Graph Inverses with Function Notation

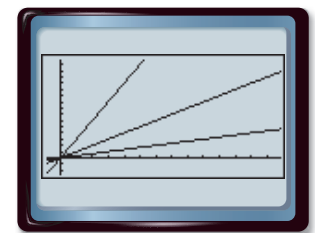
Graph  $f(x) = 3x$  and its inverse  $g(x) = \frac{x}{3}$ .

**Step 1** Clear the data from Activity 1.

KEYSTROKES:  $\boxed{\text{MENU}}$   $\boxed{2}$   $\boxed{\text{F6}}$   $\boxed{\text{F4}}$   $\boxed{\text{F1}}$   $\blacktriangleright$   $\boxed{\text{F4}}$   $\boxed{\text{F1}}$

**Step 2** Enter  $f(x)$  as Y1,  $g(x)$  as Y2, and  $y = x$  as Y3. Then graph.

KEYSTROKES:  $\boxed{\text{MENU}}$   $\boxed{5}$   $\boxed{3}$   $\boxed{\text{X},\theta,\text{T}}$   $\boxed{\text{EXE}}$   $\boxed{\text{X},\theta,\text{T}}$   $\boxed{\div}$   $\boxed{3}$   $\boxed{\text{EXE}}$   
 $\boxed{\text{X},\theta,\text{T}}$   $\boxed{\text{EXE}}$   $\boxed{\text{F6}}$



## 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  $(f \circ g)(x)$ ?