ACTIVITY 7.4

Developing Concepts

Group Activity for use with Lesson 7.4

Exploring Inverse Functions

SET UP
Work in a group of three.

MATERIALS
- graph paper
- straightedge

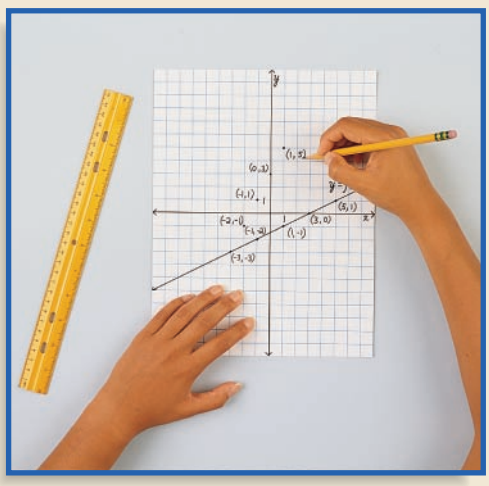
QUESTION How are a function and its *inverse* related?

EXPLORING THE CONCEPT

Use the following steps to find the inverse of $f(x) = \frac{x - 3}{2}$.

1. Choose values of x and find the corresponding values of $y = f(x)$. Plot the points and draw the line that passes through them.
2. Interchange the x- and y-coordinates of the ordered pairs found in **Step 1**. Plot the new points and draw the line that passes through them.
3. Write an equation of the line from **Step 2**. Call this function g.
4. Fold your graph paper so that the graphs of f and g coincide. How are the graphs geometrically related?
5. In words, f is the function that subtracts 3 from x and then divides the result by 2. Describe the function g in words.
6. Predict what the compositions $f(g(x))$ and $g(f(x))$ will be. Confirm your predictions by finding $f(g(x))$ and $g(f(x))$.

The functions f and g are inverses of each other.



DRAWING CONCLUSIONS

Each member in your group should choose a different function from the list below.

$$f(x) = 2x + 5 \qquad f(x) = \frac{x - 2}{4} \qquad f(x) = 5 - \frac{5}{2}x$$

1. Complete **Steps 1–3** above to find the inverse of your function.
2. Complete **Step 4**. How can you graph the inverse of a function without first finding ordered pairs (x, y)?
3. Complete **Steps 5 and 6**. How can you test to see if the function you found in Exercise 1 is indeed the inverse of the original function?