Exploring Inverse Functions

**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.

\[
\begin{align*}
f(x) &= 2x + 5 \\
f(x) &= \frac{x - 2}{4} \\
f(x) &= 5 - \frac{5}{2}x
\end{align*}
\]

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?