

Exploration 1-5a: Inverses of Functions

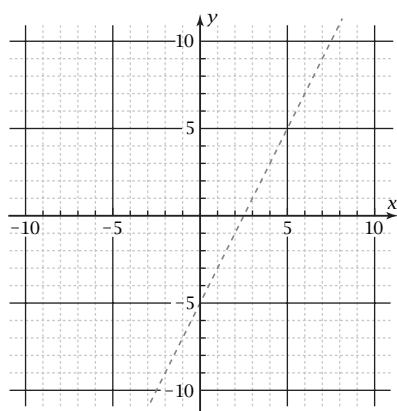
Date: _____

Objective: Find the inverse of a function graphically, numerically, or algebraically, and state whether or not the inverse is a function.

Problems 1–6 refer to the linear function $y = 2x - 5$.

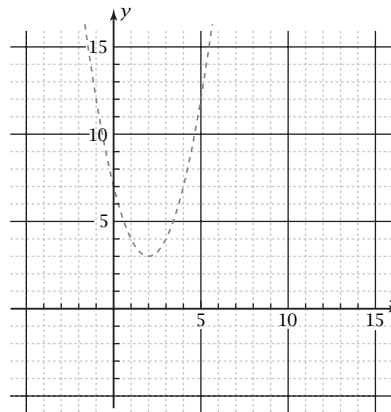
1. Write the equation for the inverse relation by interchanging the variables. Then solve the resulting equation for y in terms of x .

2. The graph shows $y = 2x - 5$. Plot the graph of the inverse relation here.



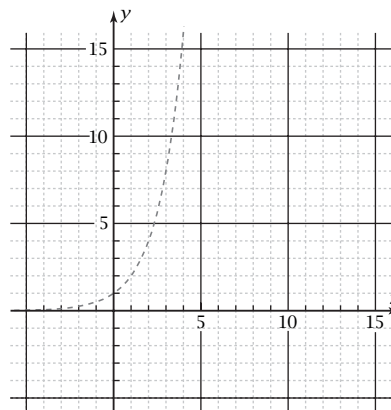
3. The inverse relation in Problems 1 and 2 is a function. How can you tell?
4. If the equation for the function is written as $f(x) = 2x - 5$, how could you write the equation for the inverse function using the $f(x)$ terminology?
5. Show that $f(3) = 1$ and $f^{-1}(1) = 3$. Explain why this is true, based on the definition of the inverse of a function.
6. Plot the line $y = x$. How are the graphs of f and f^{-1} related to this line?

Problems 7 and 8 refer to the quadratic function $y = x^2 - 4x + 7$, graphed here.



7. Plot the line $y = x$. Then plot the inverse of the function by reflecting the graph across this line.
8. Explain why the inverse of this function is not a function.

Problems 9 and 10 refer to the exponential function $f(x) = 2^x$, graphed here.



9. Find $f(0)$, $f(1)$, $f(2)$, and $f(3)$.
10. Find $f^{-1}(1)$, $f^{-1}(2)$, $f^{-1}(4)$, and $f^{-1}(8)$. Use these points to plot the graph of f^{-1} .
11. What did you learn as a result of doing this Exploration that you did not know before?