

## **Inverse Functions**

Functions that undo each other are called inverse functions.

- If  $f(x)$  is the original function, then  $f^{-1}(x)$  is its inverse.
- The domain of  $f$  becomes the range of  $f^{-1}$
- The range of  $f$  is the domain of  $f^{-1}$ .

Mapping Pattern:

If you're trying to find the inverse, you switch the  $x$  and  $y$  variables, and solve for  $y$  in the new equation.

**Example #1: Find the inverse of  $f(x) = 2x + 6$ .**

**Example #2: Find the inverse of  $g(x) = x^2 - 25$ .**

**Horizontal Line Test:** An inverse function exists if and only if the original function passes the horizontal line test. Otherwise, the inverse is a relation.

You try: Find the inverse of  $h(x) = 4x + 8$

Find the inverse of  $k(x) = x^2 - 4$

Example #3: Find the inverse of  $p(x) = \frac{x}{x+1}$

You try: Find  $f^{-1}(x)$  if  $f(x) = \frac{x}{x-3}$