Algebra 2 Notes Inverse Relations and Functions Date _____

An INVERSE RELATION (or FUNCTION) "undoes" the original relation.

We will use the symbol $f^{-1}(x)$ to represent the inverse of $f(x)$.
We can find the <u>inverse of a relation</u> by switching the $x \leftrightarrow y$ coordinates.

Relation
Is the relation a function?

x	y
-3	5
2	3
1	3

Inverse of the Relation
Is the inverse relation a function?

x	y

We can find the <u>inverse of a function</u> by switching the $x \leftrightarrow y$, then solve for y.
We can use the horizontal line on $f(x)$ test to see if $f^{-1}(x)$ is a function.

Find the inverse of $f(x) = x^2 - 2$. Is the inverse a function?

Find the inverse of $f(x) = 4x - 7$. Is the inverse a function?

$f(x)$	$f^{-1}(x)$
Domain	Domain = **Range** of $f(x)$
Range	Range = **Domain** of $f(x)$

Example:

a. Find the domain and range of $f(x) = \sqrt{x+2}$

Domain:

Range:

b. Find the inverse of $f(x) = \sqrt{x+2}$

c. Find the domain and range of $f^{-1}(x)$

Domain:

Range:

<u>Composition of Inverse Functions</u>

$(f^{-1} \circ f)(x) = x$ **AND** $(f \circ f^{-1})(x) = x$

Example: Show that the given functions are inverses of each other.

$f(x) = \frac{1}{2}x + 5$ $f^{-1}(x) = 2x - 10$