Inverse Relation:

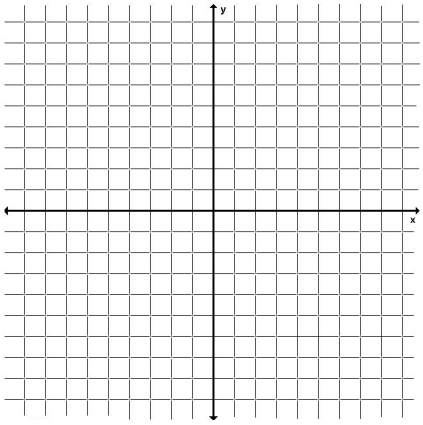
The domain of a relation becomes the _____ of its inverse, and the range

of the relation becomes the _____ of its inverse.

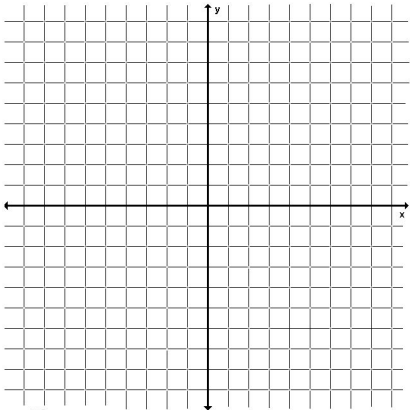
KeyConcept Inverse Relations

Words	Two relations are inverse relations if and only if whenever one relation contains the element (a, b), the other relation contains the element (b, a).
Example	A and B are inverse relations.
	$A = \{(1, 5), (2, 6), (3, 7)\}$ $B = \{(5, 1), (6, 2), (7, 3)\}$

1. The vertices of ΔABC can be represented by the relation {(1, -2), (2, 5), (4, -1)}. Find the inverse of this relation. Describe the graph of the inverse.



2. The ordered pairs of the relation {(-8, -3), (-8, -6), (-3, -6)} are the coordinates of the vertices of a right triangle. Find the inverse of this relation. Describe the graph of the inverse.



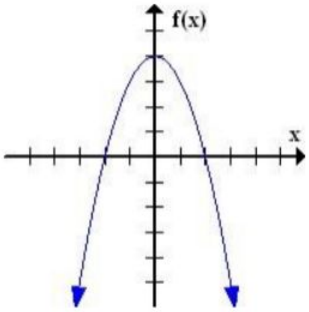
Notation for an inverse:

When the inverse of a function is a function, the original function is _____.

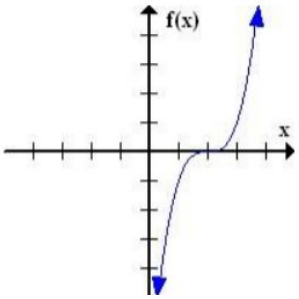
The _____ can be used to determine whether the inverse of a function is also a function.

3. Determine whether the inverse of the functions below will also be inverses.

a.



b.



c. $f(x) = \sqrt{x+4}$

d. $f(x) = x^2 - 2$

The inverse of a function can be found by swapping the _____ and

_____

4. Find the inverse of each function. Then graph the function and its inverse.

a. $y = x + 5$

b. $f(x) = x^2 + 1$

c. $y = \frac{x-3}{4}$

d. $y = 3x^2$

You can determine if functions are inverses by finding both of their _____.

If both _____ equal _____, then they are inverses.

KeyConcept Inverse Functions

Words	Two functions f and g are inverse functions if and only if both of their compositions are the identity function.
Symbols	$f(x)$ and $g(x)$ are inverses if and only if $[f \circ g](x) = x$ and $[g \circ f](x) = x$.

5. Verify that the two functions are inverses:
   a. $f(x) = 3x + 9$ and $g(x) = \frac{1}{3}x - 3$

b. $f(x) = 4x^2$ and $g(x) = 2\sqrt{x}$

c. $f(x) = 3x - 3$ and $g(x) = \frac{1}{3}x + 4$

d. $f(x) = 2x^2 - 1$ and $g(x) = \sqrt{\frac{x+1}{2}}$