Inverse Functions NOTES

□ → function #1 → △ → Function #2 → □

Find Inverses Recall that a relation (graph) is a set of ordered pairs. The inverse relation is the set of ordered pairs obtained by reversing the coordinates of each ordered pair. The domain of a relation becomes the range of the inverse, and the range of a relation becomes the domain of the inverse.

function 1 (x, y)

function 2 (y, x)

KEY CONCEPT — 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).
Examples	$Q = \{(1, 2), (3, 4), (5, 6)\}$ $S = \{(2, 1), (4, 3), (6, 5)\}$ Q and S are inverse relations.

DEFINITION: AN INVERSE FUNCTION undoes the operation of a starting function

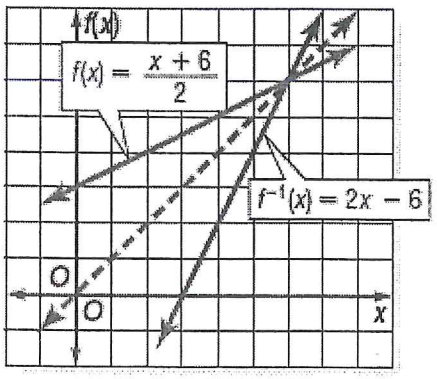
Inverses of Relations and Functions You can determine whether two functions are inverses by finding both of their compositions. If both equal the identity function $I(x) = x$, then the functions are inverse functions.

KEY CONCEPT — Inverse Functions

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

Graph the function and its inverse.

Graph both functions on the coordinate plane. The graph of $f^{-1}(x) = 2x - 6$ is the reflection of the graph of $f(x) = \frac{x + 6}{2}$ over the line $y = x$.



Find the inverse of each function.

1) $g(x) = -\dfrac{1}{x+2}$

3) $f(x) = -\dfrac{3}{x+3} + 2$

4) $f(x) = 2x + 5$

5) $f(x) = 2x + 10$

6) $g(x) = \dfrac{1}{-x-2} + 1$

7) $h(x) = -3x - 6$

8) $f(x) = \dfrac{3}{x+1}$

State if the given functions are inverses.

9) $f(x) = x + 4$
$h(x) = x - 4$

10) $h(n) = 2n + 4$
$f(n) = -2 + \frac{1}{2}n$

11) $g(x) = 3x - 2$
$f(x) = 2x - 2$

12) $g(x) = \frac{3}{4}x + 1$
$f(x) = \frac{3}{2}x$

13) $g(x) = 2x + 6$
$f(x) = -3 + \frac{1}{2}x$

14) $g(n) = -n - 4$
$f(n) = -2n - 4$