Name:___________________________________ Date:___________

PCH: Review of Inverses Ms. Loughran

The functions f and g are **inverse functions** if $f(g(x)) = g(f(x)) = x$.

Example1:

Let $f(x) = 2x + 1$ and $g(x) = \frac{x-1}{2}$, are f and g inverse functions?

The symbol f^{-1} is often used for the inverse of function *f*. The inverse "undoes" or reverses what the function has done. The inverse of a function interchanges the domain and range. That is for every point (a,b) on the graph of f, there is a point (b,a) on the graph of the inverse of *f*. The graphs of a function and its inverse are symmetric with respect to the line $y = x$.

A function whose inverse is also a function is called one to one. (can also be written as 1-1) It is easy to detect a one to one function from its graph using the **horizontal line test.** A function is 1-1 if and only if no horizontal line intersects the graph more than once.

Practice

Use compositions to prove if the given functions are inverses.

1) $g(x) = 4 - \frac{3}{2}x$

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

2) $g(n) = \frac{-12 - 2n}{3}$

$f(n) = \frac{-5 + 6n}{5}$

3) $f(n) = \frac{-16 + n}{4}$

$g(n) = 4n + 16$

4) $f(x) = -\frac{4}{7}x - \frac{16}{7}$

$g(x) = \frac{3}{2}x - \frac{3}{2}$

5) $f(n) = -(n + 1)^3$

$g(n) = 3 + n^3$

6) $f(n) = 2(n - 2)^3$

$g(n) = \frac{4 + \sqrt[3]{4n}}{2}$

7) $f(x) = \frac{4}{-x - 2} + 2$

$h(x) = -\frac{1}{x + 3}$

8) $g(x) = -\frac{2}{x} - 1$

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

Find the inverse of each function.

9) $h(x) = \sqrt[3]{x} - 3$

10) $g(x) = \frac{1}{x} - 2$

11) $h(x) = 2x^3 + 3$

12) $g(x) = -4x + 1$

13) $g(x) = \frac{7x + 18}{2}$

14) $f(x) = x + 3$

15) $f(x) = -x + 3$

16) $f(x) = 4x$

17) $h(x) = \frac{3}{-x - 2}$

18) $f(x) = -\frac{3}{-x - 3} - 2$

19) If $g(x)=3x-7,$ find $g^{-1}(-1)$.

20) If $f(x)=\dfrac{2x-1}{x+2},$ find $f^{-1}(-3)$.

21) If $g(x)=1+\sqrt[3]{2x+1},$ find $g^{-1}(4)$.