

Function Inverses

State if the given functions are inverses.

1)  $g(x) = 4 - \frac{3}{2}x$   
 $f(x) = \frac{1}{2}x + \frac{3}{2}$   
 No  
 $x = 4 - \frac{3}{2}y$   
 $\frac{3}{2}y = 4 - x$   
 $y = \frac{2}{3}(4 - x)$   
 Don't match!!

2)  $g(n) = \frac{-12 - 2n}{3}$   
 $f(n) = \frac{-5 + 6n}{5}$   
 No  
 $n = \frac{-12 - 2y}{3}$   
 $3n = -12 - 2y$   
 $\frac{3n + 12}{-2} = y$   
 Don't match!!

3)  $f(n) = \frac{-16 + n}{4}$   
 $g(n) = 4n + 16$   
 Yes  
 $n = 4y + 16$   
 $n - 16 = 4y$   
 $\frac{n - 16}{4} = y$   
 match!

4)  $f(x) = -\frac{4}{7}x - \frac{16}{7}$   
 $g(x) = \frac{3}{2}x - \frac{3}{2}$   
 No  
 $x = \frac{3}{2}y - \frac{3}{2}$   
 $x + \frac{3}{2} = \frac{3}{2}y$   
 $\frac{2}{3}(x + \frac{3}{2}) = y$   
 Don't match!!

5)  $f(n) = -(n + 1)^3$   
 $g(n) = 3 + n^3$   
 No  
 $n = 3 + y^3$   
 $n - 3 = y^3$   
 $\sqrt[3]{n - 3} = y$   
 Don't match

6)  $f(n) = 2(n - 2)^3$   
 $g(n) = \frac{4 + \sqrt[3]{4n}}{2}$   
 Yes  
 $n = \frac{4 + \sqrt[3]{4y}}{2}$   
 $2n - 4 = \sqrt[3]{4y}$   
 $y = \frac{(2n - 4)^3}{4}$   
 $y = \frac{(2^3(n - 2)^3)}{4}$   
 $y = 2(n - 2)^3$   
 Match!

7)  $f(x) = \frac{4}{-x - 2} + 2$   
 $h(x) = -\frac{1}{x + 3}$   
 No  
 $x = \frac{4}{-y - 2} + 2$   
 $x - 2 = \frac{4}{-y - 2}$   
 $-y - 2 = \frac{4}{x - 2}$   
 $y = \frac{-4}{x - 2} - 2$   
 Doesn't match f(x)

8)  $g(x) = -\frac{2}{x} - 1$   
 $f(x) = -\frac{2}{x + 1}$   
 Yes  
 $x = -\frac{2}{y + 1}$   
 $y + 1 = -\frac{2}{x}$   
 $y = -\frac{2}{x} - 1$   
 Match!

Find the inverse of each function.

9)  $h(x) = \sqrt[3]{x} - 3$   
 $h^{-1}(x) = (x + 3)^3$   
 $x = \sqrt[3]{y} - 3$   
 $x + 3 = \sqrt[3]{y}$   
 $(x + 3)^3 = y$

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

11)  $h(x) = 2x^3 + 3$   
 $h^{-1}(x) = \sqrt[3]{\frac{x - 3}{2}}$   
 $x = 2y^3 + 3$   
 $\frac{x - 3}{2} = y^3$   
 $y = \sqrt[3]{\frac{x - 3}{2}}$

12)  $g(x) = -4x + 1$   
 $g^{-1}(x) = -\frac{1}{4}x + \frac{1}{4}$   
 $x = -4y + 1$   
 $x - 1 = -4y$   
 $y = \frac{-x + 1}{4}$

13)  $g(x) = \frac{7x+18}{2}$   $x = \frac{7y+18}{2}$   
 $g^{-1}(x) = \frac{2x-18}{7}$   $2x-18=7y$   
 $y = \frac{2x-18}{7}$

14)  $f(x) = x+3$   $x = y+3$   
 $f^{-1}(x) = x-3$   $y = x-3$

15)  $f(x) = -x+3$   $x = -y+3$   
 $f^{-1}(x) = -x+3$   $x-3 = -y$   
 $y = -x+3$

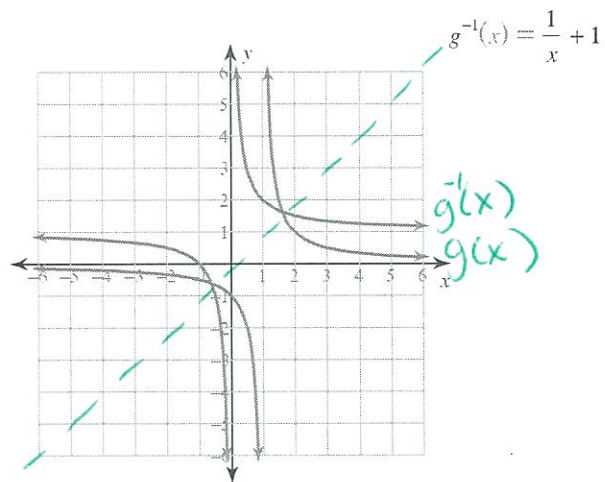
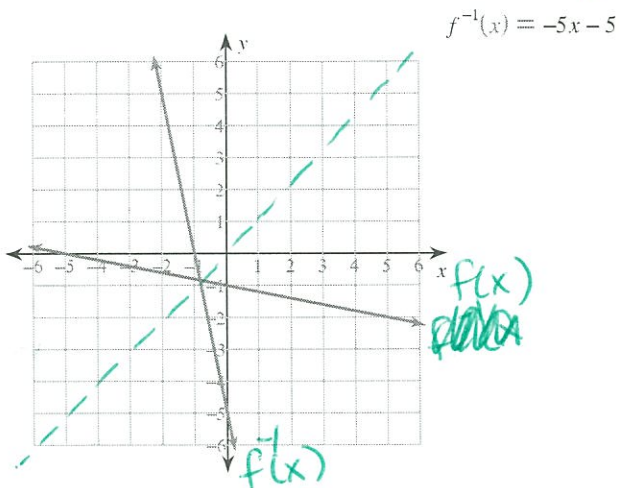
16)  $f(x) = 4x$   $x = 4y$   
 $f^{-1}(x) = \frac{x}{4}$   $y = \frac{x}{4}$

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

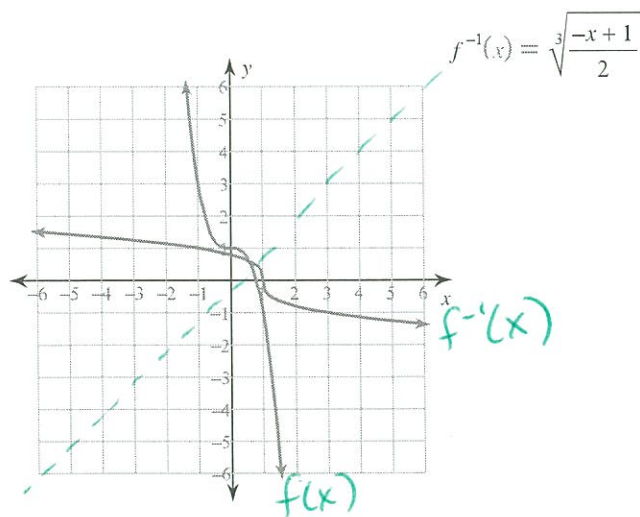
17)  $f(x) = -1 - \frac{1}{5}x$

Either: Find  $f^{-1}(x)$  and graph both  
 OR: Reflect over  $x=1$

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



19)  $f(x) = -2x^3 + 1$



20)  $g(x) = \frac{-x-5}{3}$

