

# 5.3 Inverse Functions

Pg. 343 #'s 1, 5, 7, 35-41 odd, 47, 87, 89-92

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

$f(g(x)) = 5\left(\frac{x-1}{5}\right) + 1$

$f(g(x)) = x - 1 + 1$

$f(g(x)) = x$

5)  $f(x) = \sqrt{x-4}$     $g(x) = x^2 + 4$

$f(g(x)) = \sqrt{(x^2+4)-4}$

$f(g(x)) = \sqrt{x^2}$

$f(g(x)) = x$

7)  $f(x) = \frac{1}{x}$     $g(x) = \frac{1}{x}$

$f(g(x)) = \frac{1}{\left(\frac{1}{x}\right)}$

$f(g(x)) = 1 \cdot \frac{x}{1}$

$f(g(x)) = x$

35)  $f(x) = 2x - 3$

$x = 2y - 3$

$x + 3 = 2y$

$\frac{x+3}{2} = y$

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

37)  $f(x) = x^5$

$f^{-1}(x) = \sqrt[5]{x}$

39)  $f(x) = \sqrt{x}$

$f^{-1}(x) = x^2, x \geq 0$

41)  $f(x) = \sqrt{4-x^2}$

$x = \sqrt{4-y^2}$

$x^2 = 4 - y^2$

$x^2 - 4 = -y^2$

$-x^2 + 4 = y^2$

$y = \sqrt{4-x^2}$

$f^{-1}(x) = \sqrt{4-x^2}$

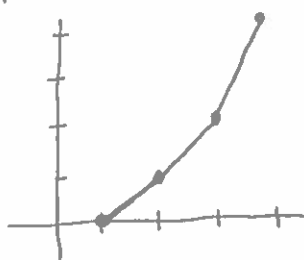
47)  $f(x)$

x	y
0	1
1	2
2	3
4	4

$f^{-1}(x)$

x	y
1	0
2	1
3	2
4	4

graph of  $f^{-1}(x)$



87)  $f(x) = k(2 - x - x^3)$

$3 = k(2 - (-2) - (-2)^3)$

$3 = k(12)$

$k = \frac{1}{4}$

$f^{-1}(3) = -2$

$f^{-1}(x) : (3, -2)$

↓

$f(x) = (-2, 3)$

89) False, horizontal line test

90) True

91) True

92) False,  $f(x) = \frac{1}{x} = f^{-1}(x)$

