Spiral Review:

Evaluate the following: $f(x) = 3x^2 - 1, \quad g(x) = 4x + 9$

1.) (f+g)(x)

2.) (f-g)(x)

3.) f ° g

4.) (g ° f)(3)

p.60 1.6 Inverse Functions

There are three ways to check if two functions are inverses!

1.) Algebraically: $f(f^{-1}(x))=x$ and $f^{-1}(f(x)) = x$

2.) Graphically: Line of symmetry y = x

**Use Horizontal Line test to determine if the function has an inverse!

3.) Numerically:

x	1	7	9		
f(x)	3	12	14		

original

x	3	12	14		
g(x)	1	7	9		

inverse

Students will be able to find the inverse of a function algebraically.

Example 1: Show that f and g are inverse functions algebraically. Graph f and g in same window and describe the relationship.

a.) $f(x) = \frac{1}{x}$

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

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

$= x$ ✓

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

$= x$ ✓

b.) $f(x) = 9 - x^2,\ x \geq 0$

$g(x) = \sqrt{9 - x}$

$f(g(x)) = 9 - (\sqrt{9-x})^2$

$= 9 - (9 - x)$

$= 9 - 9 + x$ ✓

$g(f(x)) = \sqrt{9 - (9 - x^2)}$

$= \sqrt{9 - 9 + x^2}$

$= \sqrt{x^2}$

$= x$ ✓

Students will be able to find the inverse of a function algebraically, graphically, and numerically.

Example 2:

Show that f and g are inverse functions (a) algebraically (b) graphically and (c) numerically

a.) $f(x) = \frac{x-9}{4}$

$g(x) = 4x + 9$

(a) $f(g(x)) = \frac{(4x+9)-9}{4}$

$= \frac{4x}{4}$

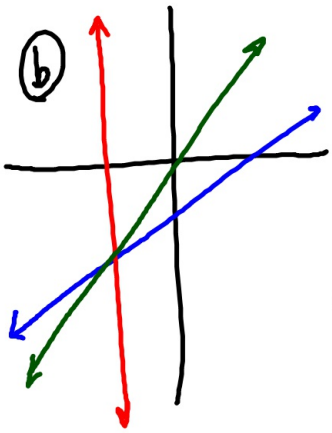
$= x$ ✓

$g(f(x)) = 4\left(\frac{x-9}{4}\right) + 9$

$= x - 9 + 9$

$= x$ ✓

(b)



(c)

x	1	5	9
f(x)	-2	-1	0

x	-2	-1	0
g(x)	1	5	9

Students will be able to find the inverse of a function algebraically, graphically, and numerically.

b.) $f(x) = \frac{x^3}{2}$

$g(x) = \sqrt[3]{2x}$

ⓐ $f(g(x)) = \frac{(\sqrt[3]{2x})^3}{2}$

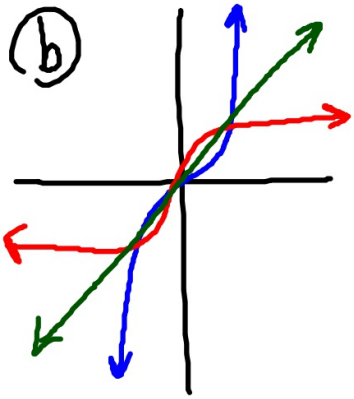
$= \frac{2x}{2} = x$ ✓

$g(f(x)) = \sqrt[3]{2\left(\frac{x^3}{2}\right)}$

$= \sqrt[3]{x^3}$

$= x$ ✓

ⓑ



ⓒ

x	0	4	6
f(x)	0	32	108

x	0	32	108
g(x)	0	4	6

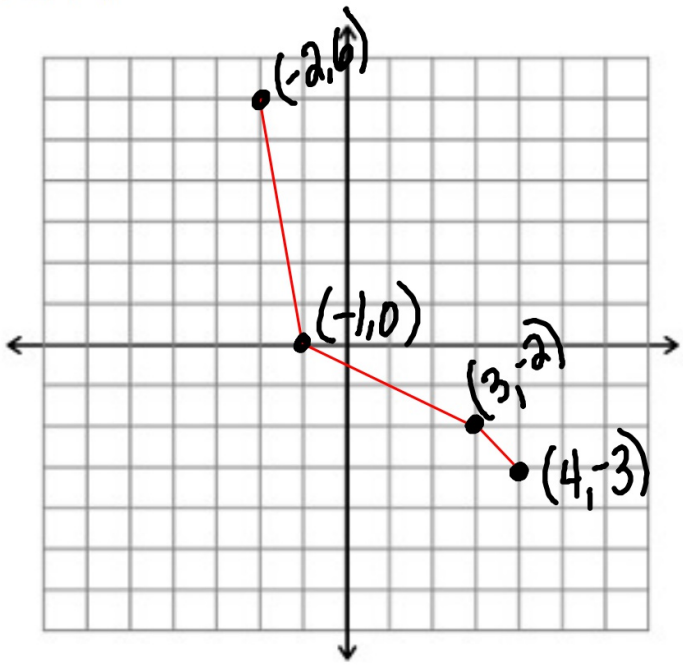
c.) $f(x) = -3x + 5$

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

Students will be able to complete the table for f^{-1} when given f.

Example 3: Complete the table of f^{-1}.

x	$f^{-1}(x)$
-3	4
-2	3
0	-1
6	-2



Turn-in #10:
p.67 (24, 34, 57 (graph only), 74)

HW:
p.67 (21-33,91 odds)