Name: _____ Class: _____ Date: _____ ID: A

Lesson #8 C: Understanding and Performing Compositions of Functions (Reference: Lesson #53 in book)

Problem

1. **Evaluate the composite function for each of the following, given the different functions.**

   1. If $f(x) = 4x^2 + 6x - 9$ and $g(x) = -3x - 4$, find $(f \circ g)(2)$ and $(g \circ f)(-2)$.

2. If $f(x) = -3x^3 + 6x^2$ and $g(x) = \sqrt{-9 + x^2}$, find $f(g(-5))$ and $g(f(0))$.

3. If $f(x) = -2x^3 + 3x^2 + 1$ and $g(x) = 3x^2$ and $h(x) = \sqrt{x}$, find $(f \circ g \circ h)(4)$.

4. **Find the composite function for each of the following, given the different functions.**

   4. Let $f(x) = -3x - 2$ and $g(x) = 3x + 4x^2$. Find the composite function $(g \circ f)(x)$ and $(f \circ g)(x)$.

5. Let $f(x) = -3x^2 - 8$ and $g(x) = 6x + 2x^2$. Find the composite function $(g \circ f)(x)$ and $(f \circ g)(x)$.

6. Let $f(x) = \sqrt[3]{-\frac{1}{6}x - 7}$ and $g(x) = -6x^3 - 42$. Find the composite function $f(g(x))$ and $g(f(x))$.

7. **Find the composite function for each of the following, given the different functions and find the domain of each of the resultant functions.**

   7. Let $f(x) = 6x^5 - 2x^4 + 3x^3$ and $g(x) = -2x^2$. Find the composite function $(g \circ f)(x)$ and $(f \circ g)(x)$.

8. Let $f(x) = \frac{1}{x}$ and $g(x) = \frac{1}{x^2}$. Find the composite function $f(g(x))$ and $g(f(x))$.

9. Let $f(x) = 3x + 2$ and $g(x) = \sqrt{x^4}$ and $h(x) = x^{\frac{1}{2}}$. Find the composite function $(g \circ h \circ f)(x)$ and $(f \circ g \circ h)(x)$.

10. Let $f(x) = \sqrt{(x-2)^4}$ and $g(x) = \frac{1}{4}x - 2$ and $h(x) = 4x + 16$. Find the composite function $f(g(h(x)))$ and $f(h(g(x)))$.