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

Lesson #8 B: 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 $f(x) = 2x^2 - x$ and $g(x) = x + 6$, find $f(g(2))$ and $g(f(2))$.

2. If $f(x) = 2x^2 - 4x$ and $g(x) = \sqrt{x^2 + 9}$, find $f(g(-4))$ and $g(f(2))$.

3. If $f(x) = 2x - 5$ and $g(x) = -3x^2 + 7x - 5$, find $\left(f \circ g\right)(2)$ and $\left(g \circ f\right)(-1)$.

4. If $f(x) = -3x + 14$ and $g(x) = -3x^3 + 2x^2$ and $h(x) = \sqrt{x^2 - 9}$, find $\left(g \circ f \circ h\right)(5)$.

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

   5. Let $f(x) = -5x - 6$ and $g(x) = -8 - 10x$. Find the composite function $f(g(x))$ and $g(f(x))$.

6. Let $f(x) = 2x - 1$ and $g(x) = -3x^2 - 2x$. Find the composite function $\left(g \circ f\right)(x)$ and $\left(f \circ g\right)(x)$.

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

8. Let $f(x) = 4x^2 - 20$ and $g(x) = \sqrt{\frac{1}{4}x + 5}$. Find the composite function $\left(g \circ f\right)(x)$ and $\left(f \circ g\right)(x)$.

9. Let $f(x) = -3x^2$ and $g(x) = -5x^3 - 3x^2 - x$. Find the composite function $f(g(x))$ and $g(f(x))$.

10. Let $f(x) = -3x - 9$ and $g(x) = -2x$ and $h(x) = -4x^2 - 2$. Find the composite function $\left(h \circ g \circ f\right)(x)$ and $\left(g \circ f \circ h\right)(x)$.

11. Let $f(x) = \sqrt[3]{x^2}$ and $g(x) = x + 2$ and $h(x) = x^3$. Find the composite function $\left(f \circ h \circ g\right)(x)$ and $\left(h \circ f \circ g\right)(x)$.

12. Let $f(x) = 3x - 7$ and $g(x) = \sqrt{2x + 10}$ and $h(x) = 2x^2 - 4$. Find the composite function $g(h(f(x)))$ and $f(h(g(x)))$.