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

Lesson #8 A: 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 $f(x) = 4x^2 - 3$ and $g(x) = 5x + 1$, find $f(g(2))$ or $(f \circ g)(2)$ and $g(f(2))$ or $(g \circ f)(2)$.

2. If $f(x) = -3x^2 - 4$ and $g(x) = \sqrt{-4x - 15}$, find $f(g(-2))$ or $(f \circ g)(-2)$ and $g(f(-2))$ or $(g \circ f)(-2)$.

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

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

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 $f(x) = -3x + 7$ and $g(x) = -5x$. Find the composite function $f(g(x))$ or $(f \circ g)(x)$ and $g(f(x))$ or $(g \circ f)(x)$.

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

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

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

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

10. Let $f(x) = 4x + 7$ and $g(x) = 3x^2 - 4x - 9$. Find the composite function $g(f(x))$ or $(g \circ f)(x)$ and $f(g(x))$ or $(f \circ g)(x)$.

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

12. Let $f(x) = -3x - 2$ and $g(x) = -4x$ and $h(x) = 2x^2 - 1$. Find the composite function $h(g(f(x)))$ or $\left(h \circ g \circ f\right)(x)$ and $f(g(h(x)))$ or $\left(f \circ g \circ h\right)(x)$.

13. Let $f(x) = 6 - 2x$ and $g(x) = x^2 - 3x$ and $h(x) = x - 5$. Find the composite function $h(g(f(x)))$ or $\left(h \circ g \circ f\right)(x)$ and $f(g(h(x)))$ or $\left(f \circ g \circ h\right)(x)$.

14. Let $f(x) = 3(2x - 1)$ and $g(x) = x^2$ and $h(x) = \sqrt{4x - 6}$. Find the composite function $h(g(f(x)))$ or $\left(h \circ g \circ f\right)(x)$ and $f(g(h(x)))$ or $\left(f \circ g \circ h\right)(x)$.