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

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

Problem

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

   1. Let $f(x) = -5x - 10x^2$ and $g(x) = 3x^2 - 4$. Find the composite function $\left(g \circ f\right)(x)$ and $\left(f \circ g\right)(x)$.

2. Let $f(x) = \left(-\frac{1}{3}x + 2\right)^{\frac{1}{4}}$ and $g(x) = -3x^4 + 6$. Find the composite function $f(g(x))$ and $g(f(x))$.

3. Let $f(x) = \frac{1}{x+1}$ and $g(x) = \frac{1}{x-2}$. Find the composite function $\left(g \circ f\right)(x)$ and $\left(f \circ g\right)(x)$.

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

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

6. Let $f(x) = x^{\frac{6}{4}}$ and $g(x) = 3x + 1$ and $h(x) = x^{\frac{8}{6}}$. Find the composite function $\left(g \circ h \circ f\right)(x)$ and $\left(f \circ h \circ g\right)(x)$.

7. Let $f(x) = \frac{1}{x+2}$ and $g(x) = \frac{x}{x-3}$. Find the composite function $f(g(x))$ and $g(f(x))$.

8. Let $f(x) = \frac{x}{x^3}$ and $g(x) = \sqrt[12]{x^5}$ and $h(x) = (2x-4)^{\frac{3}{5}}$. Find the composite function $f(g(h(x)))$ and $g(f(h(x)))$.