Precalculus Section 5.1 Exercises

1. Using the functions $f(x) = 3\sqrt{x-4}$ and $g(x) = \frac{x}{x-9}$, evaluate the following values, if they exist.

   - $(g \circ f)(0)$
   - $(g \circ f)(5)$
   - $(g \circ f)(10)$
   - $(f \circ g)(0)$
   - $(f \circ g)(13)$
   - $(f \circ g)(\frac{1}{2})$

2. Using the functions $f(x) = 3\sqrt{x-4}$ and $g(x) = \frac{x}{x-9}$, find and simplify the following functions and state the domain of each.

   - $(g \circ f)(x)$
   - $(f \circ g)(x)$
   - $(f \circ f)(x)$

3. Using the functions $f(x) = 4x$, $g(x) = \sqrt{x}$, and $h(x) = |x|$, find and simplify the following functions and state their domains.

   - $(g \circ f \circ h)(x)$
   - $(f \circ g \circ h)(x)$
   - $(g \circ h \circ f)(x)$
   - $(f \circ h \circ g)(x)$
   - $(h \circ f \circ g)(x)$
   - $(h \circ g \circ f)(x)$

4. Write the function $F(x) = \dfrac{\sqrt{x^3-7}}{x^3+2}$ as a composition of two or more non-identity functions.