Math 22: Spring 2015

Section 6.1 (Composite Functions)

1. For \( f(x) = \sqrt{x + 3} \), \( g(x) = x^2 \), \( h(x) = \frac{2}{x} \)
   
   (a) Find \((f \circ g)(1)\)
   
   (b) Find \((g \circ f)(1)\)
   
   (c) Find \((f \circ f)(6)\)
   
   (d) Find \((f \circ h)(4)\)
   
   (e) (optional) Find \((h \circ h)(5)\)

2. For \( f(x) = x^2 - 6 \), \( g(x) = \frac{1}{x + 2} \), \( h(x) = 2 + \frac{1}{x} \)
   
   (a) Find \((f \circ g)(x)\), and find its domain.
   
   (b) Find \((g \circ f)(x)\), and find its domain.
   
   (c) Find \((h \circ g)(x)\), and find its domain.

3. Find functions \( f, g \) so that \( H(x) = (f \circ g)(x) \)
   
   (a) \( H(x) = (3 - x^3)^{15} \)
   
   (b) \( H(x) = \frac{2}{3 - x} \)

4. For \( f(x) = 2(x + 3) \) and \( g(x) = \frac{1}{2}x - 3 \), show that \((f \circ g)(x) = (g \circ f)(x) = x\)