Math 151 Sec F0501/F0502
Homework Problems for Chapter 8

1. Textbook: Section 8.1: 1(b), 2(b), 3(e), 3(f)

answer for 2(b): $4t^2 - 12t + 10$

2. Textbook: Section 8.2: 3, 4, 9

answer for 4: $f(x) = x^2$; $g(x) = x^5 + 3$

3. In the following, let $f(x) = 2x - 1$, $h(x) = x^3$, $m(x) = x^2 - 9$, $k(x) = 2$

   (a) Find $(fh)(x)$ and state the domain.

   ans: $2x^4 - x^3$; all real x

   (b) Find $(h/f)(x)$ and state the domain.

   ans: $x^3/(2x - 1)$; all real $x \neq 1/2$

   (c) Find $(m - f)(x)$ and state the domain.

   ans: $x^2 - 2x - 8$; all real x

   (d) Find $(f - m)(x)$ and state the domain.

   ans: $-x^2 + 2x + 8$; all real x

   (e) Compute $(f/m)(0) - (m/f)(0)$.

   ans: $-80/9$

   (f) Find $(m \cdot (k - h))(x)$ and state the domain.

   ans: $-x^5 + 9x^3 + 2x^2 - 18$; all real x

   (g) Find $(mk)(x) - (mh)(x)$ and state the domain.

   ans: $-x^5 + 9x^3 + 2x^2 - 18$; all real x

4. Let $f(x) = 1 - 2x^2$ and $g(x) = x + 1$. Compute $(g \circ f)(x)$ and $(f \circ f)(x)$

   ans: $x - 2x^2$; $-8x^4 + 8x^2 - 1$

5. Let $f(x) = x^2 - 3x - 4$ and $g(x) = 2 - 3x$. Compute $(g \circ f)(x)$ and $(f \circ g)(-2)$

   ans: $-3x^2 + 9x + 14$; 36

6. Let $f(x) = \dfrac{3x - 4}{3x + 3}$ and $g(x) = \dfrac{x + 1}{x - 1}$. Compute $(f \circ g)(x)$ and state the domain.

   ans: $(7 - x)/(6x)$; all real x except $x = 1$ and $x = -1/2$

7. Let $h(x) = (3x - 1)^4$. Find functions f and g such that $h(x) = (f \circ g)(x)$.

   one answer: $f(x) = x^4$, $g(x) = 3x - 1$

8. Let $h(x) = (1 + x^2)^3$ and $g(x) = x^2$. Find a function $f(x)$ such that $h(x) = (f \circ g)(x)$.

   one answer: $f(x) = (1 + x)^3$

9. Let $h(x) = \dfrac{1}{|2\sqrt{x} - 7|}$ and $f(x) = 1/|x|$. Find a function g such that $h(x) = (f \circ g)(x)$. What is the domain of $h(x) = (f \circ g)(x)$?

one answer: $g(x) = 2\sqrt{x} - 7$; all real $x \geq 0$ except $x = 49/4$