Lesson 4 Practice Problems

Rules of Differentiation MATH 2200-98

Problems 1 to 6: Differentiate the given functions.

1. $f(x) = 3x^4 + 7x + 2$

2. $y = \sqrt{1 + 2e^{3x}}$

3. $y = \cos(x^2)$

4. $y = \dfrac{t\sin(t)}{1+t}$

5. $y = \sqrt{x}e^x$

6. $y = e^x \cos(\sqrt{x^3 + 2})$

7. Suppose that $f(2) = -3$, $g(2) = 4$, $f'(2) = -2$, $g'(2) = 7$. Find $h'(2)$ for each of the following.
   (a) $h(x) = 5f(x) - 4g(x)$

   (b) $h(x) = f(x)g(x)$

   (c) $h(x) = \dfrac{f(x)}{g(x)}$

   (d) $h(x) = \dfrac{g(x)}{1 + f(x)}$

8. Find an equation of the line tangent to the curve $y = 2x\sin(x)$ at the point $\left(\dfrac{\pi}{2}, \pi\right)$.