Math 125 - Fall 2006
Second Practice Examination

1. Find an equation for the tangent line to the curve

$$y = sinx - 5x \qquad \text{at the point} \quad (0, 3).$$

2. Find the first and second derivatives of the following functions.

$$\text{(a) } f(x) = x^4 + 7x + 3e^{x^3} \qquad \text{(b) } g(x) = \cos(x^4)$$

3. Suppose f and g are functions such that

$$f(5) = 3, \quad f'(5) = 1, \quad g(5) = 5 \quad \text{and} \quad g'(5) = 0.$$

What is the derivative at $x = 5$ of the function h defined by

$$h(x) = \sin(\pi x) f(x) + g(x)?$$

4. On what interval is the function

$$f(x) = (x^2 + 1)e^x$$

increasing?

5. If $f(x) = \tan(x)$, find $f'(\pi/6)$.

6. Consider the function $y = f(x)$ defined implicitly by the equation

$$xy + x^2y^3 = 10,$$

such that $f(1) = 2$. Find $f'(1)$.