Review Problems for Midterm 1

Please note that this set of problems does *not* necessarily cover all topics that may appear on your exam.

- 1. Let $f(x) = e^{\sin(2x+3)}$. Find f'(x).
- 2. Let $f(x) = \tan(2\pi x)$. Find f'(1/8).
- 3. Let $y = \sin(x^3)\cos(2x)$. Find $\frac{dy}{dx}$.
- 4. Find the tangent line to $y = e^x + 5x^2$ at x = 1.
- 5. Solve $\log (x+2) \log (x-1) = \log (2)$ for x.

6. Evaluate (or state that the limit does not exist): $\lim_{x \to \infty} \frac{\sqrt{x^3 - 3x^2 + 5}}{x^2 + x - 10}.$

7. Evaluate (or state that the limit does not exist): $\lim \sin x$.

8. Evaluate (or state that the limit does not exist): $\lim_{x \to \infty} \frac{x^3 + 2}{x^7 - x}$.

9. Let $f(x) = \frac{x^3 - x^2 + 2}{x^3 - 1}$. Find all vertical and horizontal asymptotes.

10. Use the limit definition of the derivative to compute the derivative of $y = 2x^2 + 5x - 6$.

11. Evaluate (or state that the limit does not exist): $\lim_{x \to 0} \frac{\sin(x)\cos(x)}{x}$.

12. Show that there is some x such that $x^2 = \sin(x) + 5$.