Exam 2

Friday, April 7

1. Consider the line $\frac{x}{a} + \frac{y}{b} = 1$, where a and b are constants.
   (a) (5 points) Find the x- and y-intercepts of the line.
   (b) (25 points) Find the point on the line closest to the origin.
2. (20 points) Evaluate $\lim_{x \to 0} \left(\frac{1}{\sin x} - \frac{1}{x} \right)$.
3. (25 points) Graph $y = 2x^3 - 3x^2$.
4. (a) (15 points) Consider the area bounded by the lines $y = x + 1$ and $y = x - 1$ and the hyperbola $y = \frac{2}{x}$. Find an expression for this area using integrals.
   (b) (10 points) Evaluate the expression you found in part (a). Recall that $\int \frac{1}{x}\, dx = \log|x| + C$. Depending on how you set things up, the absolute value may be important.