Math 105 Assignment 1
Due the week of January 10

1. (a) Find a function whose derivative is $1/x^2 - 2/x^5$. (2 points)

(b) Find a function whose derivative is $2e^{2x} + 5 \sec 3t \tan 3t$. (2 points)

(c) Use parts (a) and (b) above to determine the indefinite integral

$$\int \left[ \frac{1}{s^2} - \frac{2}{s^5} - 2e^{2s} - 5 \sec 3s \tan 3s \right] ds.$$ (2 points)
2. Explain in a few words which change of variable would be appropriate for the following integral, and then use it to evaluate the integral:

\[ \int (x^2 - x)(2x^3 - 3x^2 + 14)^{11} \, dx. \]

(2 + 2 = 4 points)
3. Find a function $g$ such that

$$g'(x) = \frac{\sin(\ln x^3)}{4x}.$$ 

How many such functions are there? 

(4 + 1 = 5 points)