

**Math 105 Assignment 1**  
Due the week of January 10

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

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

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

$$\int \left[ \frac{1}{s^2} - \frac{2}{s^{\frac{5}{2}}} - 2e^{2s} - 5 \sec 3s \tan 3s \right] ds.$$

(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)