$\begin{array}{c} \text{Math 1311} \\ \text{Test 3} \\ \text{Fall 2003} \end{array}$

1. Find the indefinite integrals.

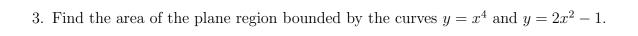
(a)
$$\int \frac{7}{(2x+3)^3} dx$$

(b)
$$\int \frac{x^5 - 2x + 5}{x^3} dx$$

2. Evaluate the integrals.

(a)
$$\int_0^{\frac{\pi}{4}} \frac{\sin t}{\sqrt{\cos t}} dt$$

(b)
$$\int_0^2 x^2 \sqrt{9 - x^3} dx$$



4. Calculate the trapezoidal approximation and Simpson's approximation to

$$\int_0^\pi \sqrt{1 - \cos x} dx$$

with six subintervals.

5. Use the definition of the integral as a limit of a Riemann sum to evaluate the integral

$$\int_0^1 (2x^2 - 1)dx$$

6. (optional) Bonus 10 points

Find a function f such that

$$x^{2} = 1 + \int_{1}^{x} \sqrt{1 + [f(t)]^{2}} dt$$

(Hint: Differentiate both sides)