

YOUR NAME: \_\_\_\_\_

George Voutsadakis

Read each problem **very carefully** before starting to solve it. Each problem is worth 10 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. Compute the following indefinite integrals:

(a)  $\int \left( 10\sqrt[3]{x^2} - \frac{16}{\sqrt[3]{x^5}} \right) dx =$

(b)  $\int \frac{6xe^{3x} + 5}{x} dx =$

2. Suppose that a flue epidemic spreads at the rate of  $r(t) = 25e^{0.05t}$  cases per day and that at the beginning, when it was first detected, there were 100 cases.

(a) Find a function  $N(t)$  giving the total number of cases present at day  $t$ .

(b) Find the average number of cases per day in the first 10 days.

3. Find the area under the curve of  $f(x) = e^{x/2} + \frac{1}{x}$  from  $x = 1$  to  $x = 2$ .

4. Find the area of the region bounded by the graphs of  $f(x) = 2x^3 + x$  and  $g(x) = x^3 + 2x$ .

5. Compute the following indefinite integrals using substitution.

(a)  $\int 3x(x^2 - 1)^4 dx$

(b)  $\int \frac{6x^2}{\sqrt[5]{x^3 + 1}} dx.$