EXAM 4 - MATH 112

DATE: Friday, April 7

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 3 points. It is necessary to show your work. Correct answers without explanations are worth 0 points.

GOOD LUCK!!

1. Find the equation of the function f whose graph passes through the point $(3, 25)$ and whose derivative is $f(x) = \frac{3x}{\sqrt{x^2+7}}$.

2. Compute the following integrals:

   (a) $\int (3x - 12)e^{5x^2-40x}dx$

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

3. Evaluate the following definite integrals:

   (a) $\int_0^1 e^{2x}\sqrt{e^{2x}+1}dx$

   (b) $\int_1^2 \frac{(2+\ln x)^3}{x}dx$

4. Find the area of the region that is bounded by the graphs of $y = x^3$ and $y = 4x$.

5. Approximate the area of the region under the graph of $f(x) = x^3 - 1$ from $x = 1$ to $x = 3$ by using the Midpoint Rule with $n = 4$. Then find the exact area of that region.

6. Find the volume of the solid of revolution formed by revolving the region bounded by the graphs of the equations $y = -x^2 + 4x$, $y = x$ around the x-axis.