

EXAM 4 - MATH 112

DATE: Friday, April 13

INSTRUCTOR: George Voutsadakis

Read each problem very carefully before starting to solve it. Each question is worth 5 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 $f'(x) = \frac{5x}{\sqrt{2x^2+7}}$. (5 points)
2. Compute the following integrals:
 - (a) $\int (5x - 20)e^{3x^2-24x} dx$ (2.5 points)
 - (b) $\int \frac{x^2-8x}{3+12x^2-x^3} dx$ (2.5 points)
3. Evaluate the following definite integrals:
 - (a) $\int_1^2 \frac{1}{e^{2x}-1} dx$
 - (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 $y = \sqrt[3]{x}$ and $y = \frac{1}{4}x$.
5. Approximate the area of the region under the graph of $f(x) = \frac{1}{x^2}$ 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 (in the first quadrant) bounded by the graphs of the equations $y = \frac{1}{1+x^2}$, $x = 0$ and $y = \frac{1}{2}$ around the y -axis.