

EXAM 2 - MATH 152

Friday, October 11

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 integral  $\int \frac{dx}{x^2\sqrt{x^2+4}}$ .

[**Hint:** Eventually, you might want to convert to sines and cosines.]

2. Compute the integral  $\int \frac{x^2 - 8x}{(x + 1)(x + 4)^2} dx$ .

3. Compute the improper integral  $\int_1^{\infty} \frac{\ln x}{x^2} dx$ .

4. Find the surface area of the solid resulting by revolving the graph of  $y = x^3$  on  $[0, 1]$  around the  $x$ -axis.

5. Consider the plate shaded in the figure, which is submerged in a liquid of density  $\rho$  so that its top is exactly at the surface of the liquid. Find the force exerted by the liquid on one side of the plate. Assume the acceleration of gravity is  $g$  and treat both  $\rho$  and  $g$  as fixed (unspecified) constants.

