

EXAM 2 - MATH 152

Friday, October 13

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

$$\int \frac{1}{\sqrt{16 - 25x^2}} dx.$$

2. Compute the integral

$$\int \frac{x^2 - 20x + 5}{x^3 + 5x^2 + x + 5} dx.$$

(**Hint:** Use grouping to factor the denominator.)

3. Decide whether the following improper integral converges or diverges and, if it converges, calculate its value. (Please, show all steps needed clearly.)

$$\int_3^{\infty} 5(4x - 3)^{-3/2} dx.$$

4. Find the arc length of the graph of  $f(x) = x^2 - \frac{1}{8} \ln x$  on  $[1, e]$ .

5. The following graph depicts a plate submerged in a liquid of density  $\rho$ . Find the force exerted on one side of the plate. (Assume that the acceleration of gravity is  $g$  and treat both  $\rho$  and  $g$  as constants without assigning them specific values.)

