

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

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Read each problem **very carefully** before starting to solve it. Each problem is worth around 5 points. It is necessary to show **all** your work. Correct answers without explanations are worth 0 points. GOOD LUCK!!

1. [3 points] Compute the indefinite integral

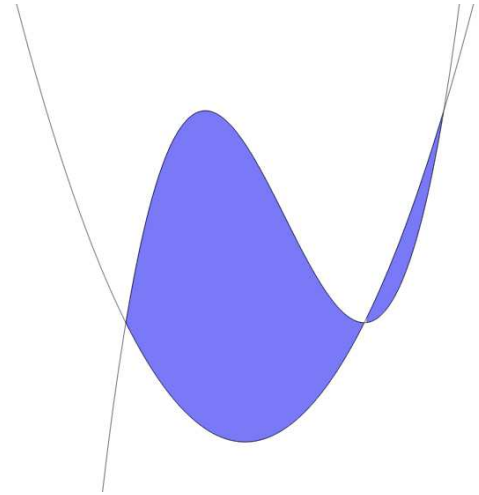
$$\int \frac{(x^2 + 1)(x - 3)}{x^2} dx$$

2. [4 points] Compute the average value of the function  $f(x) = e^{x/2} + \frac{2}{\sqrt{x}}$  on  $[1, 3]$ . Please, leave your answer with  $e$ 's in it; do not use your calculators to express it in decimal.

3. [5 points]

Consider the functions  $f(x) = x^3 + 3x^2$  and  $g(x) = x^2 + 3x$ . Our goal is to find the area of the region bounded by the graphs of  $y = f(x)$  and  $y = g(x)$  (shown on the right).

(a) Find the points, where these two graphs intersect.



(b) Find the relative positions of the graphs over each interval.

(c) Set up the definite integrals and compute the area of the region.