

**WRITE YOUR NAME:**

MAC 2312 Homework 6  
Due in class, Friday March 31st  
You can use more paper if necessary, but please STAPLE

**Question 1.** Evaluate the integral.

$$\int \frac{x^2 + 4x - 9}{x^3 - 6x^2 + 9x} dx$$

**Question 2.** Evaluate the integral.

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

**Question 3.** Evaluate the integral.

$$\int_4^6 \frac{15x - 31}{x^2 - 4x + 3} dx$$

**Question 4.** Use both the Trapezoid Rule and Simpson's Rule with  $n = 4$  to estimate the definite integral.

$$\int_0^2 \frac{1}{x^3 + 1} dx$$

**BONUS QUESTION:** Can you find an antiderivative of  $\frac{1}{x^3+1}$  by hand? It's time-consuming, but possible. Hint: First factor  $x^3 + 1$  using the formula for factoring a sum of cubes. Then use partial fractions. Then do some more algebra.

Since it is *possible* but very *time-consuming* to find an antiderivative of  $\frac{1}{x^3+1}$ , you can see why we might want to do approximate integration instead, since then we just have to do messy arithmetic instead of messy algebra.