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AMS326

Midterm 1

The first step in our process was to find the area of the graph enclosed by the equation and the red line denoted by . The numerical process I used was the trapezoidal rule. I had taken the sum of all trapezoids from x = 0 to x = 1. This “width” of the trapezoids I had used . This gave me a good approximation of the area. I had also doubled the area since it was only from the positive x-axis and needed the other half from the negative x-axis. However, I had to subtract the area by (2/26) due to the fact that it had to be enclosed by the red line. This had given me an answer of 0.4951994333918072.

For the triangle area, I had simply implemented a sort of binary search to find the half-base of the triangle. The equation of the line was used to represent the side of the triangle. I had found the specific line equation by hand using the known vertex of the triangle. This got me the equation . Within the binary search for “b”, I had used a simple iterative for loop to go over all the domain of “x” to find the intersection. Once I had found the half-base of the triangle, I simply multiplied it by the height which was (25/26). This would get me a rectangle made out of the half-base, which is exactly two triangles. I had gotten the area of the triangle to be 0.369811496441181

After that, it was a simple subtraction to get the remaining area of the Runge function. The answer was 0.12538793695062622

Below is a visualization of the Triangle line, Runge’s function, and confirmation of my answers.

