Assignment: Perform a complete analysis of the problem of finding the volume of the solid obtained by rotating the region enclosed by the curves

\[ y = \frac{4.7}{x}, \quad y = 0.3, \quad x = 1.2, \text{ and } x = 4.7 \]

about the line \( y = -1.5 \).

You should turn in a 1-3 page summary containing your analysis and copies of your MATLAB programs.

Details: There are two main elements of this analysis: (I) problem formulation and (II) integral evaluation. For the problem formulation, you need to

1. Sketch the described region.
2. Sketch the appropriate volume showing approximating pieces.
3. Sketch and label a representative piece.
4. Express the volume of the representative piece mathematically.
5. Express an approximation to the total volume as a sum of the volume of the pieces.
6. Express the actual volume as a limit involving the approximation.
7. Realize the limit as a definite integral.

Once you have a definite integral, you’ll need to evaluate it first by the Fundamental Theorem of Calculus, i.e. find an antiderivative, etc. and then use an appropriate MATLAB program to compute approximations.

Program Issues: Use Midpoint, Trapezoid or Simpson’s method (from HW Project #3) for your computed approximations. Since you’ll have the antiderivative you can use it in your program to get the exact value for comparison with your computed results. Summarize the results in a table showing how the approximations converge towards the exact value as you increase the number of subintervals, i.e. how information about the solution increases as we add detail.