Math 8   Assignment 1

Due: Start of class on Friday April 2.

The goal of this assignment is to evaluate this integral:

$$\int_1^{e^4} \pi(4 - \ln y)\, dy.$$

Without knowing the anti derivative of $\ln y$, the above integral seems impossible to compute. The following steps will guide you through another way of solving this problem using techniques for calculating volumes of revolution.

1. **The given definite integral can be viewed as a volume calculation. What solid of revolution, using the washer method, would yield such an integral as the volume?** *Remember the volume of a washer is given by,*

   $$V_{washer} = \pi(R^2 - r^2)h$$

   where R is the outer radius, r is the inner radius, and h is the height.

2. **Use a different method of calculating volumes of solids of revolution to set up a new definite integral equal to the given one.** *Draw graphs and pictures.*

3. **Evaluate the new integral.** *The substitution method may be helpful.*

Present your solution and reasoning clearly. Use complete sentences, and diagrams and graphs as needed. You do not need to type up your solution, but write and draw clearly. Proof read your work.