

Due Monday, September 19th at the beginning of class. Please use additional paper as necessary to submit CLEAR and COMPLETE solutions.

1. Consider the region R in the xy -plane bounded by the curves

$$y = 0, \quad x = e, \quad y = \ln x.$$

Find the volumes of the solids obtained by rotating R about the coordinate axes.

2. Find the volume of the solid obtained by rotating the region between the curves

$$y = \sin x, \quad y = \cos x, \quad \frac{\pi}{4} \leq x \leq \frac{5\pi}{4}$$

around the line $y = -1$.

3. Find the volume of the solid obtained by rotating the region between the curves

$$y = 0, \quad x = 1, \quad y = 1/x$$

about the x -axis. [Note that this is an improper integral.]

4. Find the volume of the solid obtained by rotating the region inside the circle $(x - R)^2 + y^2 = r^2$ around the y -axis (assume $R > r$). [You should get $2\pi^2 r^2 R$.]