

Review of AP AB Integration

Instructions:

- This is due on Sep 15.
 - Only one report is to be handed in per group, and signed by all contributing members.
 - All answers must be written in complete sentences. You will be graded on completeness, organization, and clarity of expression.
1. Write up your answers (and work) for the entire AP AB Integration lab.
 2. Consider the solid formed when you rotate the region $y = \frac{1}{x}$, where $1 < x < b$, about the x -axis.
 - (a) Use Maple to plot the resulting solid, when $b = 10$. You will need to use the command *VolumeOfRevolution* after loading the Student Calculus 1 package. You should feel free to read about this command, either in Maple help, or on any other internet site.
 - (b) Answer the following. Make sure to show your work.
 - i. Compute the volume of the solid of rotation where, once again, $1 < x < b$. Your answer should involve b .
 - ii. Suppose you want to find the volume of the solid created when $1 < x < \infty$. To do so, you can find $\lim_{b \rightarrow \infty}$ of your answer above. What do you get?
 - (c) To find the surface area of the solid created by rotating $y = \frac{1}{x}$, with $1 < x < b$, about the x -axis, we need to find $2\pi \int_1^b \left(\frac{1}{x}\right) \sqrt{1 + \frac{1}{x^4}} dx$.
 - i. Explain why $2\pi \int_1^b \left(\frac{1}{x}\right) \sqrt{1 + \frac{1}{x^4}} dx > 2\pi \int_1^b \frac{1}{x} dx$.
 - ii. Using the same idea as in (b), find $\int_1^\infty \frac{1}{x} dx$.
 - iii. What can you conclude about the surface area of the solid created by rotating $y = \frac{1}{x}$, with $1 < x < \infty$, about the x -axis?