MAT137 Problem Set 5

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1. (Gabriel's Horn) Consider the solid of revolution obtained by rotating the function $f(x) = \dfrac{1}{x}$ about the y-axis in the interval $(0, 1)$. The resulting solid is called *Gabriel's Horn.*

   (a) Write down an integral which represents the volume of Gabriel's Horn. Does this integral converge? If yes, to what value? If no, give a proof. *Hint:* Recall that $\displaystyle\int_1^\infty f(x)\,dx := \lim_{R\to\infty} \int_1^R f(x)\,dx$.