Let $f(x) = \frac{1}{x}$. Consider the solid generated by rotating $f(x)$ about the x-axis between $x=1$ and $x=\infty$. Find the area of a cross sectional slice.

Find the volume.

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$$\int_1^\infty \frac{1}{x} \, dx$$

$$= \left[\ln x \right]_1^\infty$$

$$= \lim_{N \to \infty} \ln N - \ln 1$$

$\therefore$ As n goes to ∞, $\int_1^\infty \frac{1}{x} \, dx$ diverges and the cross sectional area is infinite.

$$\int_1^\infty \pi r^2 \, dx$$

$$= \pi \int_1^\infty \frac{1}{x^2} \, dx$$

$$= \pi \lim_{N \to \infty} \frac{x^{-1}}{-1} \bigg|_1^N$$

$$\to -\pi \lim_{N \to \infty} \frac{1}{x} \bigg|_1^N$$

$$= -\pi (0 - 1)$$

$$= \pi$$