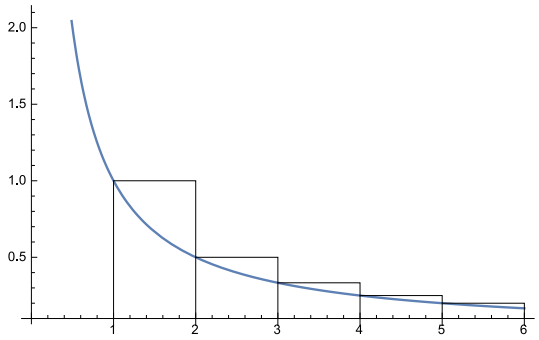
Solution (#1325) Below is a graph of $y = 1/x$ for $x > 0$. Note that the rectangles sit above the graph and so have a greater area.



The rectangles each have unit base and heights of 1, $\frac{1}{2}$, $\frac{1}{3}$, ... Hence

$$\ln n = \int_1^n \frac{\mathrm{d}x}{x} \leqslant 1 + \frac{1}{2} + \frac{1}{3} + \cdots + \frac{1}{n-1}.$$

As $\ln n$ increases without bound (Proposition 5.19), then the harmonic series increases without bound.