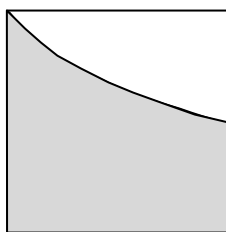
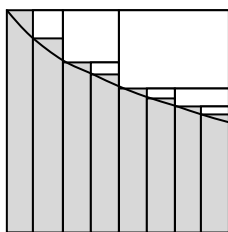
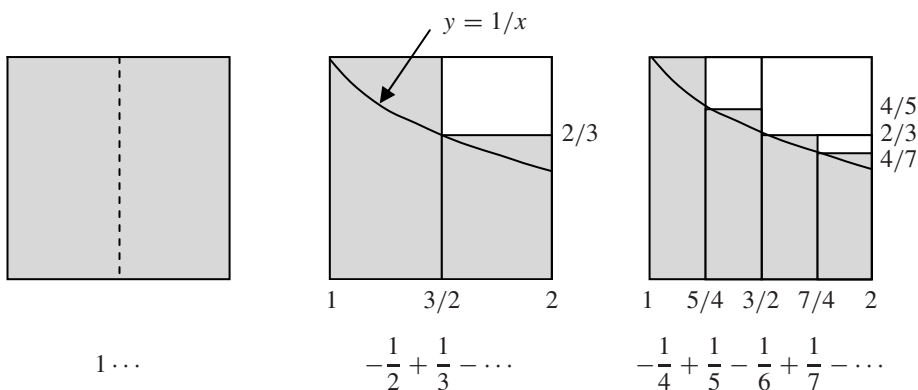


# Proof Without Words: The Alternating Harmonic Series Sums to $\ln 2$

CLAIM.  $\sum_{n=0}^{\infty} (-1)^n \frac{1}{n+1} = \ln 2.$



$$-\frac{1}{8} + \frac{1}{9} - \frac{1}{10} + \frac{1}{11} - \frac{1}{12} + \frac{1}{13} - \frac{1}{14} + \frac{1}{15} - \dots = \int_1^2 \frac{1}{x} dx = \ln 2$$

—Matt Hudelson  
Washington State University  
Pullman WA 99164

**Summary** We demonstrate graphically the result that the alternating harmonic series sums to the natural logarithm of two. This is accomplished through a sequence of strategic replacements of rectangles with others of lesser area. In the limit, we obtain the region beneath the curve  $y = 1/x$  and above the  $x$ -axis between the values of one and two.