

## SEQUENCES QUIZ

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Name: Solutions

1. Find a formula for the general term of the sequence  $\{a_n\}_{n=1}^{\infty}$  assuming the pattern continues, then compute the limit of the sequence.

$$\left\{ \ln\left(\frac{1}{2}\right), \ln\left(\frac{2}{3}\right), \ln\left(\frac{3}{4}\right), \ln\left(\frac{4}{5}\right), \ln\left(\frac{5}{6}\right), \dots \right\}$$

$$a_n = \ln\left(\frac{n}{n+1}\right)$$

$$\lim_{n \rightarrow \infty} \frac{n}{n+1} \stackrel{\text{L'H}}{=} \lim_{n \rightarrow \infty} \frac{1}{1} = \lim_{n \rightarrow \infty} 1 = 1$$

So, because  $\ln(x)$  is continuous

$$\begin{aligned} \lim_{n \rightarrow \infty} \ln\left(\frac{n}{n+1}\right) &= \ln\left(\lim_{n \rightarrow \infty} \frac{n}{n+1}\right) \\ &= \ln(1) \\ &= \boxed{0} \end{aligned}$$