

Calculus II

Convergence of sequences from limits of rational functions

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Example

Find $\lim_{n \rightarrow \infty} \frac{n}{n+1}$.

Divide numerator and denominator by the highest power of n , and use the limit laws:

$$\begin{aligned}
 \lim_{n \rightarrow \infty} \frac{n}{n+1} \cdot \frac{1}{\frac{1}{n}} &= \lim_{n \rightarrow \infty} \frac{1}{1 + \frac{1}{n}} \\
 &= \frac{\lim_{n \rightarrow \infty} 1}{\lim_{n \rightarrow \infty} 1 + \lim_{n \rightarrow \infty} \frac{1}{n}} \\
 &= \frac{1}{1 + 0} \\
 &= 1
 \end{aligned}$$