Calculus II
Convergence of sequences from limtis of rational functions

Todor Milev

2019

Example

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

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

$$\lim_{n\to\infty} \frac{n}{n+1}$$

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

$$\lim_{n\to\infty} \frac{n}{n+1} \cdot \frac{\frac{1}{n}}{\frac{1}{n}}$$

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

$$\lim_{n\to\infty} \frac{n}{n+1} \cdot \frac{\frac{1}{n}}{\frac{1}{n}} \quad = \quad \lim_{n\to\infty} \frac{1}{1+\frac{1}{n}}$$

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

$$\begin{aligned}\lim_{n\to\infty} \frac{n}{n+1} \cdot \frac{\frac{1}{n}}{\frac{1}{n}} &= \lim_{n\to\infty} \frac{1}{1+\frac{1}{n}} \\ &= \frac{\lim\limits_{n\to\infty} 1}{\lim\limits_{n\to\infty} 1 + \lim\limits_{n\to\infty} \frac{1}{n}}\end{aligned}$$

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

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

Example

Find $\lim_{n\to\infty} \frac{n}{n+1}$.
Divide numerator and denominator by the highest power of n, and use the limit laws:

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