8. Hafta Perşembe Dersi

15 Nisan 2021 Perşembe 11:22

Örn $a_n = \sqrt[n]{n}$ dizinin limiti =?

$$\boxed{\lim_{n\to\infty} \sqrt[n]{n} = 1} \qquad \sqrt[n]{n} \to n^{1/n}$$

$$y = \lim_{n\to\infty} n^{1/n}$$

$$\ln y = \ln \lim_{n\to\infty} n^{1/n} = \lim_{n\to\infty} \ln n^{1/n} = \lim_{n\to\infty} \frac{1}{n}\cdot \ln n \quad \frac{\infty}{\infty}$$

$$\overset{L'}{=} \lim_{n\to\infty} \frac{1/n}{1} = \frac{0}{1} = 0 \qquad \ln y = 0 \Rightarrow y = e^0 = 1$$

* $$\boxed{\lim_{n\to\infty} x^{1/n} = 1 \quad (x>0)}$$

Örn $\lim_{n\to\infty} 5^{1/n} = 1$ $\quad \lim_{n\to\infty} \sqrt[n]{\pi} = 1$ $\quad \lim_{n\to\infty} \sqrt[n]{e} = 1$

* $$\boxed{\lim_{n\to\infty} \left(1+\frac{x}{n}\right)^n = e^x \qquad \lim_{n\to\infty} \left(1+\frac{1}{n}\right)^n = e}$$

Örn $a_n = \left(1+\frac{\pi}{n}\right)^n$ $\quad \lim_{n\to\infty} a_n = e^{\pi}$ $\qquad a_n = \left(\frac{n-2}{n}\right)^n \Rightarrow \lim_{n\to\infty} a_n = e^{-2}$

$a_n = \left(\frac{n+1}{n}\right)^n$ $\quad \lim_{n\to\infty} a_n = e$

* $\lim_{n\to\infty} x^n = \infty \quad (x>1)$

Örn $a_n = e^n$ $\quad \lim_{n\to\infty} a_n = \infty$

$a_n = \left(-1/2\right)^n$ $\quad \lim_{n\to\infty} a_n = 0$

$a_n = \left(1/5\right)^n$ $\quad \lim_{n\to\infty} a_n = 0$

* $$\boxed{\lim_{n\to\infty} x^n = \begin{cases} 0, & |x|<1 \\ 1 & x=1 \\ \infty & x<-1,\ x>1 \end{cases}}$$

* $$\boxed{\lim_{n\to\infty} \frac{x^n}{n!} = 0}$$

Örn $\lim_{n\to\infty} \sqrt[n]{en} = 1$

* $$\boxed{\lim_{n\to\infty} \sqrt[n]{xn} = 1 \quad x>0}$$

$\sqrt[n]{x} \quad \sqrt[n]{n}$

Örn $\lim_{n\to\infty} \frac{50^n}{n!} = 0$

$\underbrace{\qquad\qquad\qquad\qquad}_{n \to \infty}$

$\sqrt[n]{x} \quad \sqrt[n]{n}$

$x^{1/n} \to 1 \quad n^{1/n} \to 1$

örn $\lim_{n \to \infty} \frac{50^n}{n!} = 0$