A $\lim\limits_{x\to+\infty}\left(1+\frac{1}{x}\right)^x = e$ -re visszavezet-

hető feladatok

(1) $\lim\limits_{x\to 0}(1+x)^{\frac{1}{x}} =$

$x = \frac{1}{t} \Rightarrow$ ha $x \to 0$, akkor $t \to +\infty$

$\lim\limits_{x\to 0}(1+x)^{\frac{1}{x}} = \lim\limits_{x\to+\infty}\left(1+\frac{1}{t}\right)^t = e$

$\Rightarrow \lim\limits_{x\to 0}(1+x)^{\frac{1}{x}} = e$

(2) $\lim\limits_{x\to-\infty}\left(1+\frac{1}{x}\right)^x$

$x = -(z+1)$

Ha $x\to-\infty$, $z\to+\infty$

$\lim\limits_{x\to-\infty}\left(1+\frac{1}{x}\right)^x = \lim\limits_{z\to+\infty}\left(1-\frac{1}{z+1}\right)^{-(z+1)} =$

$= \lim\limits_{z\to+\infty}\left(\frac{z+1-1}{z+1}\right)^{-(z+1)} = \lim\limits_{z\to+\infty}\left(\frac{z}{z+1}\right)^{-(z+1)} =$

$= \lim\limits_{z\to+\infty}\left(\frac{z+1}{z}\right)^{z+1} = \lim\limits_{z\to+\infty}\underbrace{\left(1+\frac{1}{z}\right)^z}_{e}\cdot\underbrace{\left(1+\frac{1}{z}\right)}_{1} = e$

lim