

17, 2

بالتكامل

قاعدة ل'Hôpital

مشتق

$$\lim_{x \rightarrow 1} \frac{(x-1)(x-2)}{(x-1)(x-3)} = \frac{1}{2}$$

$$\lim_{x \rightarrow 0} \frac{|e^x - 1| - |e^x + 1|}{x} \rightarrow \frac{-(e^x - 1) - (e^x + 1)}{0^+} = \frac{-4x}{x} = -4$$

$$\lim_{x \rightarrow 0} \frac{\sqrt{x^2 - 2}}{\sqrt{x} - 2} = \frac{(\sqrt{x-2})(\sqrt{x+2})}{\sqrt{x} - 2} \cdot \frac{\sqrt{x} + 2}{\sqrt{x} + 2} = \frac{\sqrt{x^2 - 2}(\sqrt{x} + 2)}{x - 4}$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{x}(\sqrt{x+1})}{(x-1)(x+1)} = \frac{\sqrt{1}}{1}$$

$$\lim_{x \rightarrow 1} \frac{1 - \sqrt{x}}{1 - \sqrt{x+1}} = \frac{1 - \sqrt{x}}{(1 - \sqrt{x})(1 + \sqrt{x})} = \frac{1}{1 + \sqrt{x}} = \frac{1}{2}$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} = \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} \cdot \frac{\sqrt{x+1} + 1}{\sqrt{x+1} + 1} = \frac{x+1 - 1}{(\sqrt{x} - 1)(\sqrt{x+1} + 1)} = \frac{x}{(\sqrt{x} - 1)(\sqrt{x+1} + 1)}$$

$$\lim_{x \rightarrow 1} \frac{(x-1)^{1/2}}{(x-1)^{1/3}} = \frac{1/2}{1/3} = \frac{3}{2}$$

$$\lim_{x \rightarrow 1} \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} = \frac{\sqrt{x+1} + 1}{\sqrt{x+1} + 1} \cdot \frac{\sqrt{x} + 1}{\sqrt{x} + 1} = \frac{x+1 - 1}{(x-1)(\sqrt{x+1} + 1)(\sqrt{x} + 1)}$$

~~$$\lim_{x \rightarrow 1} \frac{\sqrt{x+1} - 1}{\sqrt{x} - 1} = \frac{\sqrt{x+1} + 1}{\sqrt{x+1} + 1} \cdot \frac{\sqrt{x} + 1}{\sqrt{x} + 1} = \frac{x+1 - 1}{(x-1)(\sqrt{x+1} + 1)(\sqrt{x} + 1)}$$~~

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$$\lim_{x \rightarrow \pi} \frac{1 + \cos x}{\sin x} = \frac{(1 - \cos x + \cos x)(1 + \cos x)}{(1 - \cos x)(1 + \cos x)} = \frac{1}{1} = 1$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{1 - \tan x}{\sin x - \cos x} = \frac{1 - \frac{\sin x}{\cos x}}{\sin x - \cos x} = \frac{\frac{\cos x - \sin x}{\cos x}}{\sin x - \cos x} = \frac{-1}{1} = -1$$

$$\frac{1}{\sqrt{r}} = \frac{-r \times \sqrt{r}}{r} = -\sqrt{r}$$

$$\lim_{x \rightarrow \frac{\pi}{2}} \frac{\tan x - 1}{\cos x} = \frac{(\tan x - 1)(\tan x + 1)}{\cos x (\tan x + 1)} = \frac{\frac{\sin^2 x}{\cos^2 x} - 1}{\cos x \left(\frac{\sin x}{\cos x} + 1\right)} = \frac{\sin^2 x - \cos^2 x}{\cos x (\sin x + \cos x)} = \frac{\sin x - \cos x}{\cos x} = 1$$

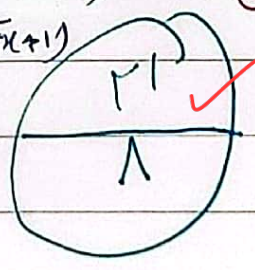
$$\frac{-1}{\cos \frac{\pi}{2}} = \frac{-1}{0}$$

$$\frac{1 - \sqrt{x}}{x - \sqrt{x}} \times \frac{1 + \sqrt{x}}{1 + \sqrt{x}} = \frac{(1 - \sqrt{x})(1 + \sqrt{x})}{(x - \sqrt{x})(1 + \sqrt{x})}$$

سوال کے جواب

$$\frac{(x + \sqrt{x} - x)(\sqrt{x} + \sqrt{x+1})}{(x-1)(\sqrt{x} + \sqrt{x+1} + 1)} = \frac{x(\sqrt{x} + \sqrt{x+1})}{(x-1)(\sqrt{x} + \sqrt{x+1} + 1)}$$

سوال کے جواب



$$\text{L'Hop} \rightarrow \lim_{n \rightarrow \infty} \frac{1 - \frac{1}{\sqrt{n}}}{\frac{1}{n}} = \frac{\frac{1}{\infty}}{\frac{1}{\infty}} = \frac{1}{1}$$

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$$\text{L'Hop} \rightarrow \lim_{n \rightarrow \infty} \frac{\frac{\mu}{\sqrt{\mu n + \nu}}}{\frac{\omega}{\sqrt{\mu(\omega n + \nu)}}} = \frac{\frac{\mu}{\infty}}{\frac{\omega}{\infty}} = \frac{\mu}{\omega}$$

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