

Limites Notáveis!!!

Indeterminações

$$\infty - \infty, \quad \frac{\infty}{\infty}, \quad \frac{0}{0}, \quad 0 \times \infty$$

Recorda, para $a > 1$,

$\lim_{x \rightarrow -\infty} (a^x) = 0$	$\lim_{x \rightarrow +\infty} (a^x) = +\infty$	$\lim_{x \rightarrow 0^+} (\log_a x) = -\infty$	$\lim_{x \rightarrow +\infty} (\log_a x) = +\infty$
$\lim_{x \rightarrow +\infty} \frac{a^x}{x^p} = +\infty, p \in \mathbb{R}$	$\lim_{x \rightarrow +\infty} \frac{x^p}{a^x} = 0, p \in \mathbb{R}$	$\lim_{x \rightarrow +\infty} \frac{\log_a(x)}{x^p} = 0, p > 0$	$\lim_{x \rightarrow +\infty} \frac{x^p}{\log_a(x)} = +\infty, p > 0$
$\lim_{x \rightarrow 0} \frac{e^{bx} - 1}{bx} = 1, b \neq 0$		$\lim_{x \rightarrow 0} \frac{\ln(bx+1)}{bx} = 1, b \neq 0$	

Limites Notáveis:

$\lim_{x \rightarrow +\infty} \frac{e^x}{x^p} = +\infty, p \in \mathbb{R}$	$\lim_{x \rightarrow +\infty} \frac{\ln(x)}{x} = 0$
$\lim_{x \rightarrow 0} \frac{e^x - 1}{x} = 1$	$\lim_{x \rightarrow 0} \frac{\ln(x+1)}{x} = 1$

Usando os limites indicados, calcula os seguintes limites:

1. $\lim_{x \rightarrow 0} \frac{e^x - e^{2x}}{5x}$

2. $\lim_{h \rightarrow 0} \frac{e^{h+3} - e^3}{h}$

3. $\lim_{n \rightarrow +\infty} (2n+1) \left(e^{\frac{1}{n}} - 1 \right)$

4. $\lim_{x \rightarrow 0} \frac{2^x + x^2}{x+1}$

5. $\lim_{x \rightarrow -\infty} \frac{1}{xe^x}$

6. $\lim_{x \rightarrow 0^+} x^2 e^{\frac{1}{x}}$

7. $\lim_{x \rightarrow 0} \frac{\ln(x+2) - \ln 2}{2x}$

8. $\lim_{x \rightarrow 0} \frac{\ln(x+1)^3}{2x}$

9. $\lim_{x \rightarrow 3} \frac{x^2 - 5x + 6}{\ln(x-2)}$

10. $\lim_{x \rightarrow 0} \frac{\log(x+2) - \log 2}{2x}$

11. $\lim_{x \rightarrow 0} \frac{\ln(1+3x)}{4x}$

12. $\lim_{x \rightarrow -5} \frac{\ln(6+x)}{x+5}$

13. $\lim_{x \rightarrow +\infty} \frac{\ln(3x)}{x}$

14. $\lim_{x \rightarrow 0} \frac{e^{2x} - 1}{\ln(3x+1)}$

15. $\lim_{x \rightarrow +\infty} 2x \cdot \ln\left(1 + \frac{1}{x}\right)$

17. $\lim_{x \rightarrow +\infty} \frac{\ln(3+x)}{x+1}$

18. $\lim_{x \rightarrow +\infty} [\ln(x+1) - x]$

19. $\lim_{x \rightarrow 1} f(x)$, sendo

$$f(x) = \begin{cases} \frac{2x^2 - x}{4x - 1}, & x \leq 1 \\ \frac{\ln(2x-1)}{x-1}, & x > 1 \end{cases}$$