Limites de Funções Logarítmicas

Uma página e 4 limites resolvidos

Propriedade: $\lim\limits_{x\to a}(\log_b f(x)) = \log\left[\lim\limits_{x\to a}(f(x))\right]$

1. $\lim\limits_{x\to 8}(\log_4 2x) = \log_4\left[\lim\limits_{x\to 8}(2x)\right] = \log_4[2.8] = \log_4 16 = \log_4 2^4 = 4.\frac{1}{2} = 2$

2. $\lim\limits_{x\to -2}\left[\log\frac{3-\sqrt{1-4x}}{\sqrt{6+x}-2}\right] = \log\left[\lim\limits_{x\to -2}\frac{3-\sqrt{1-4x}}{\sqrt{6+x}-2}\right] = \log\left[\lim\limits_{x\to -2}\frac{\left(3-\sqrt{1-4x}\right)}{\left(\sqrt{6+x}-2\right)}.\frac{\left(3+\sqrt{1-4x}\right)}{\left(3+\sqrt{1-4x}\right)}\frac{\left(\sqrt{6+x}+2\right)}{\left(\sqrt{6+x}+2\right)}\right] =$

$\log\left[\lim\limits_{x\to -2}\frac{\left(3^2-(1-4x)\right)}{\left((6+x)-2^2\right)}.\frac{\left(\sqrt{6+x}+2\right)}{\left(3+\sqrt{1-4x}\right)}\right] = \log\left[\lim\limits_{x\to -2}\frac{(9-1+4x)}{(6+x-4)}.\frac{\left(\sqrt{6+x}+2\right)}{\left(3+\sqrt{1-4x}\right)}\right] =$

$\log\left[\lim\limits_{x\to -2}\frac{(8+4x)}{(2+x)}.\frac{\left(\sqrt{6+x}+2\right)}{\left(3+\sqrt{1-4x}\right)}\right] = \log\left[\lim\limits_{x\to -2}\frac{4.(2+x)}{(2+x)}.\frac{\left(\sqrt{6+x}+2\right)}{\left(3+\sqrt{1-4x}\right)}\right] = \log\left[\lim\limits_{x\to -2}4.\frac{\left(\sqrt{6+x}+2\right)}{\left(3+\sqrt{1-4x}\right)}\right] =$

$\log\left[4.\frac{\left(\sqrt{6-2}+2\right)}{\left(3+\sqrt{1-4(-2)}\right)}\right] = \log\left[4.\frac{4}{(3+3)}\right] = \log\frac{16}{9} = 2.\log\frac{4}{3}$

3. $\lim\limits_{x\to\infty}[\log(x+1)-\log x] = ?$

$\lim\limits_{x\to\infty}[\log(x+1)-\log x] = \lim\limits_{x\to\infty}\left[\log\frac{(x+1)}{x}\right] = \log\left[\lim\limits_{x\to\infty}\frac{x+1}{x}\right] \log\left[\lim\limits_{x\to\infty}\left(1+\frac{1}{x}\right)\right] = \log[1] = 0$

4. $\lim\limits_{x\to\infty}\left[\log(x+1)^x-\log x^x\right] = ?$ **à** $\lim\limits_{x\to\infty}\left[\log(x+1)^x-\log x^x\right] = \lim\limits_{x\to\infty}\left[\log\frac{(x+1)^x}{x^x}\right] =$

$\lim\limits_{x\to\infty}\left[\log\left(\frac{x+1}{x}\right)^x\right] = \lim\limits_{x\to\infty}\left[\log\left(\frac{x+1}{x}\right)^x\right] = \log\left[\lim\limits_{x\to\infty}\left(\frac{x+1}{x}\right)^x\right] = \log\left[\lim\limits_{x\to\infty}\left(1+\frac{1}{x}\right)^x\right] = \log[e] =$

$\log e = \frac{\ln e}{\ln 10} = \frac{1}{\ln 10}$