ФИПТ: Андреев А.А. ИУ7-24Б 12 мая 2020

1) $\lim\limits_{\substack{x\to 0\\ y\to 0}} \frac{x}{x^2+2y^2} = \left\{\begin{matrix} x = r\cos\varphi \\ y = r\sin\varphi \end{matrix}\right\} = \lim\limits_{r\to 0} \frac{\cos\varphi}{r^2(\cos^2\varphi + 2\sin^2\varphi)} = \infty$

2) $\lim\limits_{\substack{x\to\infty\\ y\to\infty}} \frac{\sqrt{x^2+y^2+6}+x^2+y^2}{\sqrt{x^4+y^4+2(1+x^2y^2)}-\sqrt{x^2+y^2}} = \left\{\begin{matrix} x = r\cos\varphi \\ y = r\sin\varphi \end{matrix}\right\} =$

$= \lim\limits_{r\to\infty} \frac{\sqrt{1/r^2 + 6/r^4} + 1}{\sqrt{1+\frac{2}{r^4}} - \frac{1}{r}}$

3) $\lim\limits_{\substack{x\to 0\\ y\to 0}} \frac{\sqrt{x^2y^2+1}-1}{x^2+y^2} = \{y = kx\} = \lim\limits_{x\to 0} \frac{\sqrt{k^2+x^4+1}-1}{(k+1)\cdot x^2} = 0$

4) $\lim\limits_{\substack{x\to 0\\ y\to 0}} \frac{xy}{1-\sqrt[3]{1+xy}} = \{y = kx\} = \lim\limits_{x\to 0} \frac{kx^2}{1-\sqrt[3]{1+kx^2}} = -3$

5) $\lim\limits_{x\to 0} \frac{\sin(x^3+y^3)}{x^2+y^2} = \{y = kx\} = \lim\limits_{x\to 0} \frac{(\sin(kx+1)x^3)'}{((k+1)x^3)'} =$

$= \lim\limits_{x\to 0} \frac{3(k+1)x^2\cos((k+1)x^3)}{2(k+1)x}$