1.证明：在$\mathbb{R}^2$中无数个边长为1的正方形紧密排列，不是闭集

5.2. A

3.(3) $|3x-4y-1|=|3x-9-(4y-8)|\leq 3|x-3|+4|y-2|<4(|x-3|+|y-2|)$

令 $\delta=\frac{\varepsilon}{8}$，当$|x-3|<\delta$，$|y-2|<\delta$时，原式$<\varepsilon$.

$\therefore \lim\limits_{(x,y)\to(3,2)}(3x-4y)=1$

4.(2) 令 $y=-x+kx^2$ $\therefore \frac{xy}{x+y}=-\frac{1}{k}+x$

$\therefore \lim\limits_{(x,y)\to(0,0)}\frac{xy}{x+y}=\lim\limits_{x\to0}(-\frac{1}{k}+x)=-\frac{1}{k}$，极限值随k变化而变化.

$\therefore$ 极限不存在.

5.(3) 设 $y=2$. 则 $\lim\limits_{(x,y)\to(0,2)}\frac{\sin xy}{x}=\lim\limits_{x\to0}\frac{\sin 2x}{x}=\lim\limits_{x\to0}\frac{2\cos 2x}{1}=2$

5.(4) 设 $y=x>0$

则 $\lim\limits_{(x,y)\to(0,0)}x^2y^2\ln(x^2+y^2)=\lim\limits_{x\to0}x^4\ln(2x^2)=\lim\limits_{x\to0}x^4\ln2+\lim\limits_{x\to0}x^4\ln 2x$

$=\lim\limits_{x\to0}\frac{2\ln x}{\frac{1}{x^4}}=\lim\limits_{x\to0}(-\frac{1}{2})x^2=0$