2005年度　微積分学II　演習問題(2)

1. 次の関数 $f(x,y)$ の偏微分を求めよ.

(1) $f(x,y)=x^2y^3$

(2) $f(x,y)=xy^4+x^2+y^2+3x+3$

(3) $f(x,y)=(2x-y)^3$

(4) $f(x,y)=(x^2+3y)^2$

(5) $f(x,y)=\dfrac{1}{xy}$

(6) $f(x,y)=\dfrac{x}{y}$

(7) $f(x,y)=\sin(x+y)$

(8) $f(x,y)=\cos(x^2+y^2)$

(9) $f(x,y)=\tan(xy)$

(10) $f(x,y)=\log(x^2+y^2)$

(11) $f(x,y)=\sin(x^2+y^2)$

(12) $f(x,y)=(2x+3y)^4(5x+6y)^7$

(13) $f(x,y)=\dfrac{1}{\sqrt{x^2+y^2}}$

(14) $f(x,y)=e^{x^2+y^2}$

(15) $f(x,y)=\sin(x^2y^3)$

(16) $f(x,y)=\sqrt{x^2+xy+y^3}$

(17) $f(x,y)=\log(\cos(xy)+2)$

(18) $f(x,y)=x^y$

(19) $f(x,y,z)=x+2y+3z$

(20) $f(x,y,z)=x^2+y^2+z^2+xyz$

(21) $f(x,y,z)=x^2y^3z^5$

(22) $f(x,y,z)=(x^2+yz)^3$

(23) $f(x,y,z)=\sin(xyz)$

(24) $f(x,y,z)=xy\cos z$

(25) $f(x,y,z)=\dfrac{z}{xy}$

(26) $f(x,y,z)=\dfrac{x^2+y^2}{z}$

2. 次の関数の $(x,y)=(0,0)$ における偏微分可能性を調べよ. 偏微分可能な場合は $f_x(0,0)$, $f_y(0,0)$ を求めよ.

(1) $f(x,y)=\dfrac{2x+3y}{x^2+xy+y^2+4}$

(2) $f(x,y)=\dfrac{x}{x^2+y^2+1}$

(3) $f(x,y)=\dfrac{x+5y}{2x^2+y^4+3}$

(4) $f(x,y)=(x+1)|y|$

(5) $f(x,y)=\begin{cases}\dfrac{xy}{x^2+y^2} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$

(6) $f(x,y)=\begin{cases}\dfrac{x^3+y^2}{\sqrt{x^2+y^2}} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$

(7) $f(x,y)=\begin{cases}\dfrac{x^2y}{x^2+y^2} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$

(8) $f(x,y)=\begin{cases}\dfrac{x^3}{x^2+y^2} & (x,y)\neq(0,0)\\ 0 & (x,y)=(0,0)\end{cases}$