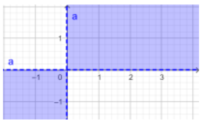
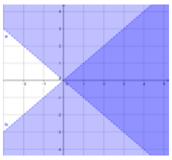
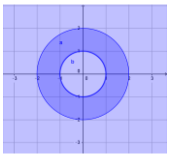
1.1. (a) $D(f)=\{(x,y)\in R^2 | [(x>0)\cap(y>0)]\cup[(x<0)\cap(y<0)]\}$



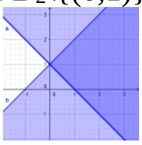
(b) $D(f)=\{(x,y)\in R^2 | x>0\}\cap\{(x,y)\in R^2 | -x<y<x\}$



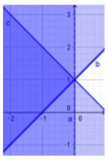
(c) $D(f)=\{(x,y)\in R^2 | 1\le x^2+y^2\le 4\}$



(d) $D(f) = D_1\cup D_2\setminus\{(0,1)\}$

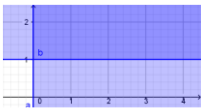


$D_1=\{(x,y)\in R^2 | x>0\}\cap\{(x,y)\in R^2 | 1-x\le y\le 1+x\}$

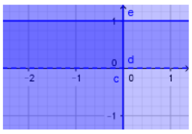


$D_2=\{(x,y)\in R^2 | x<0\}\cap\{(x,y)\in R^2 | 1+x\le y\le 1-x\}$

(e) $D(f) = D_1\cup D_2$

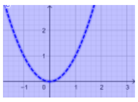


$D_1=\{(x,y)\in R^2 | x\ge 0 \quad \cap \quad y\ge 1\}$

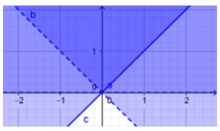


$D_2=\{(x,y)\in R^2 | x\le 0 \quad \cap \quad 0<y\le 1\}$

(f) $D(f)=\{(x,y)\in R^2 | y\ne x^2\}$



(g) $D(f)=\{(x,y)\in R^2 | y>0 \quad \cap \quad -y<x\le y\}$.



(h) $D(f)=\{(x,y)\in R^2 | x>0 \quad \cap \quad 2k\pi<y<(2k+1)\pi\}$ ($k\in\mathbf{Z}$).

(i) $D(f)=\{(x,y)\in R^2 | y\ne(2k+1)\pi/2\}$ ($k\in\mathbf{Z}$).

1.2. (a) $D(f)=\{(x,y)\in R^2 | x\ne 0\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y)=0$.

(b) $D(f) = \mathbf{R}^2\setminus\{(0,0)\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y)=0$.

(c) $D(f)=\{(x,y)\in R^2 | y\ne 0\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y)=1/2$.

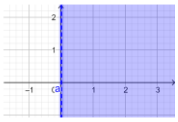
(d) $D(f) =\{(x,y)\in\mathbf{R}^2 | y\ne x\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y)=0$.

(e) $D(f) = \mathbf{R}^2\backslash\{(0,0)\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y) = \sqrt{e}$.

(f) $D(f) = \{(x,y)\in\mathbf{R}^2 | x \neq 0\}\cup\{(x,y)\in\mathbf{R}^2 | y \neq 0\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y) = 0$.

(g) $D(f) = \mathbf{R}^2\backslash\{(0,0)\}$, $\lim\limits_{(x,y)\to(0,0)} f(x,y) = 0$.

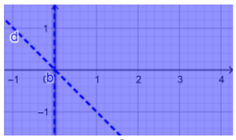
1.5. $D(f) = \{(x,y)\in R^2 | x > 0\}$



$\lim\limits_{(x,y)\to(0^+,0)} f(x,y) = 0$ khi $m > 1$, $\lim\limits_{(x,y)\to(0^+,0)} f(x,y)$ không tồn tại khi $0 < m \leq 1$.

1.6. (a) 3, (b) e^2, (c) 0, (d) 0, (e) 0, (f) 0, (g) -2

1.8. (a) $D(f) = \{(x,y)\in\mathbf{R}^2 | x \neq 0\}\cap\{(x,y)\in\mathbf{R}^2 | x+y \neq 0\}\cup\{(0,0)\}$, f(x,y) không liên tục tại điểm O(0,0).



(b) $D(f) = \mathbf{R}^2$, a = 0 thì f(x,y) liên tục tại điểm O(0,0), $a \neq 0$ thì f(x,y) không liên tục tại điểm O(0,0).

1.9. Khảo sát sự liên tục của các hàm số f(x,y) sau đây, trên tập xác định D(f) của nó

(a) $D(f) = \mathbf{R}^2$, f(x,y) không liên tục tại điểm (0,0) và liên tục tại mọi điểm $(x,y)\in D(f)\backslash\{(0,0)\}$.

(b) $D(f) = \mathbf{R}^2$, f(x,y) liên tục trên D(f).

1.10. (a) $D(f) = \mathbf{R}^2$, chọn được p = 0; (b) $D(f) = \mathbf{R}^2$, không chọn được p.

1.11. $\begin{cases} f'_x(x,y) = x^{xy}(1+\ln x)y \\ f'_y(x,y) = x^{xy+1}\ln x \end{cases}$, $\begin{cases} f''_{x^2}(x,y) = x^{xy-1}y[1+(1+\ln x)^2 xy] \\ f''_{y^2}(x,y) = x^{xy+2}\ln^2 x \end{cases}$, $\begin{cases} f''_{xy}(x,y) = x^{xy}(1+\ln x)(1+xy\ln x) \\ f''_{yx}(x,y) = x^{xy}(1+\ln x)(1+xy\ln x) \end{cases}$

1.12. (a) $\begin{cases} \dfrac{\partial f(x(u,v),y(u,v))}{\partial u} = -(4u+\sin 2u)e^{\cos^2 u-2(u^2+v^2)} \\ \dfrac{\partial f(x(u,v),y(u,v))}{\partial v} = -4ve^{\cos^2 u-2(u^2+v^2)} \end{cases}$, (b) $\begin{cases} \dfrac{\partial f(x(u,v),y(u,v))}{\partial u} = \dfrac{2}{u} \\ \dfrac{\partial f(x(u,v),y(u,v))}{\partial v} = \dfrac{2(v^4-1)}{v(v^4+1)} \end{cases}$

(c) $\begin{cases} \dfrac{\partial f(x(u,v),y(u,v))}{\partial u} = (1+2uv)e^{u(uv+1)} + uv(2-ue^u)e^{-e^u} \\ \dfrac{\partial f(x(u,v),y(u,v))}{\partial v} = u^2(e^{u(uv+1)} + e^{-e^u}) \end{cases}$

(d) $\begin{cases} \dfrac{\partial f(x(u,v),y(u,v))}{\partial u} = \dfrac{u}{v^2}\left(2\ln(3u-2v) + \dfrac{3u}{3u-2v}\right) \\ \dfrac{\partial f(x(u,v),y(u,v))}{\partial v} = \dfrac{2u^2}{v^2}\left(\dfrac{\ln(3u-2v)}{v} + \dfrac{1}{3u-2v}\right) \end{cases}$

1.13. $2\left(\dfrac{1}{x}+\ln x\right)e^x$

1.14. $(t^2-3t+1)[2(2t-3)\sin t + (t^2-3t+1)\cos t]$

1.19. (a) $\dfrac{\partial f(1,2,-1)}{\partial \vec{e}} = -\dfrac{28}{3}$, (b) $\dfrac{\partial f(1,1,1)}{\partial \vec{e}} = \dfrac{1}{6}$, (c) $\dfrac{\partial f(1,1)}{\partial \vec{e}} = \dfrac{7}{5}$

1.20. (a) $\dfrac{\partial f(1,3,0)}{\partial \vec{e}} = -\sqrt{\dfrac{3}{2}}$, (b) $\sqrt{5}$

1.21. (a) $2x\cos(x^2+y^2)dx + 2y\cos(x^2+y^2)dy$, (b) $e^x(\cos y + \sin y + x\sin y)dx + e^x(x\cos y - \sin y)dy$

(c) $\dfrac{-y}{x^2+y^2}dx+\dfrac{x}{x^2+y^2}dy$, (d) $\left(\dfrac{e^{x/y}}{y}+\dfrac{ye^{-y/x}}{x^2}\right)dx-\left(\dfrac{xe^{x/y}}{y^2}+\dfrac{e^{-y/x}}{x}\right)dy$

(e) $(e^y+ze^x)dx+(e^z+xe^y)dy+(e^x+ye^z)dz$, (f) $x^{y^2z-1}y^2zdx+2x^{y^2z}yz\ln xdy+x^{y^2z}y^2\ln xdz$

1.22. $dx-2dy$

1.23. (a) $y'(x)=\dfrac{y(3x^2-y^2)}{x(3y^2-x^2)}$, (b) $y'(x)=-\dfrac{e^y+y(e^x-e^{xy})}{e^x+x(e^y-e^{xy})}$, (c) $y'(x)=\dfrac{a^2}{(x+y)^2}$

(d) $y'(x)=\dfrac{x+y}{x-y}$, $y''(x)=2\dfrac{x^2+y^2}{(x-y)^3}$.

1.24. (a) Không có cực trị, (b) $f_{cđ}=f(1,1)=1$, (c) Không có cực trị, (d) $f_{ct}=f(0,0)=0$

1.26. f_{ct} = f(3,3,3) = 9.

1.27. Tam giác đều có $S_{cđ}=\dfrac{3\sqrt{3}}{4}R^2$

1.28. (a) GTNN = –64 tại điểm (4,2), GTLN = 4 tại điểm (2,1).
(b) GTNN = –1 tại điểm (–1,–1), GTLN = 6 tại các điểm (–3,0), (0,–3).