CÁLCULO II

Lista 3: Parte 1

1. Ache e esboce o dimínio das funções:

$a)$ $f(x,y) = \sqrt{x-y}$ $\quad$ $c)$ $f(x,y) = \operatorname{arctg}\dfrac{y}{x}$

$c)$ $f(x,y) = \dfrac{1}{\sqrt{x^2+y^2-1}}$ $\quad$ $d)$ $f(x,y,z) = \dfrac{x}{y^z}$

$e)$ $f(x,y) = \operatorname{tg}(x-y)$ $\quad$ $f)$ $f(x,y) = \ln(xy^2 - x^3)$

2. Esboce uma família de curvas de nivel de:

$$(a)\, f(x,y) = \frac{x+y}{x-y}, \qquad (b)\, f(x,y) = \operatorname{sen}(xy), \qquad (c)\, f(x,y) = \frac{x}{y}.$$

3. Esboce os gráficos de:

$a)$ $f(x,y) = 1-x-y$ $\quad$ $c)$ $f(x,y) = x$ $\quad$ $c)$ $f(x,y) = \sqrt{x^2+y^2}$

$d)$ $f(x,y) = x^2+y^2$ $\quad$ $e)$ $f(x,y) = x^2-y^2$ $\quad$ $f)$ $f(x,y) = y^2$

$g)$ $f(x,y) = y^2+x$ $\quad$ $h)$ $f(x,y) = xy$ $\quad$ $i)$ $f(x,y) = e^{-x^2-y^2}$

4. Calcule os seguintes limites, caso existam. Se não existirem, justifique:

$a)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{x^2y}{x^4+y^2}$ $\quad$ $c)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{xy}{x^2+y^2}$

$c)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{xy}{x^3-y}$ $\quad$ $d)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{x^2y\cos(x^2+y^2)}{x^2+y^2}$

$e)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{x^4\operatorname{sen}(x^2+y^2)}{x^4+y^2}$ $\quad$ $f)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{x^3+y^3}{x^2+y^2}$

$g)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{(x+y)^3}{x^2+y^2}$ $\quad$ $h)$ $\displaystyle\lim_{(x,y)\to(0,0)} \frac{x^2y}{2x^4+x^2y+y^2}$