Questão 1

~~f(x,y)~~ $\cancel{K = e^{x}}$ Ex01

$K = e^{y/x^3}$ como $e^x = K$

$\ln K = \frac{y}{x^3}$

$K = (1, 3)$

$\ln(1) = \frac{y}{x^3}$ $\Rightarrow = K = 1$

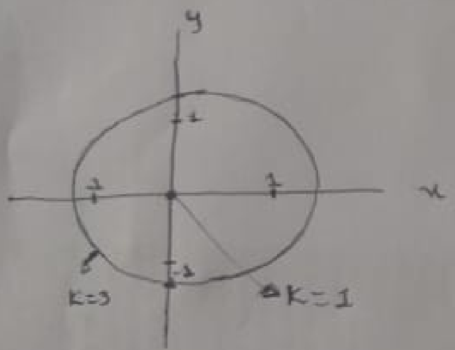
$\hookrightarrow 0 = 0$

$\ln(3) = \frac{y}{x^3}$ $K = 3$

$\hookrightarrow 0 = 1{,}09$

$K = r^2$

$r = \sqrt{K}$



Questão 2

a) $\lim\limits_{(x,y)\to(0,0)} \frac{xy^3}{x^2+y^6}$

1) $x = y^3$

$\lim\limits_{(x,y)(0,0)} \frac{y^3 y^3}{y^6+y6}$

$\lim\limits_{x,y\,(0,0)} = \frac{1}{2}$

$\{ x = 2y^3$

$\frac{2y^3 2y^3}{4y^6 4y^6}$

$\lim\limits_{x,y\,(0,0)} = \frac{2}{5}$

Neste caso o limite não existe

b) $\lim\limits_{(x,y)(0,0)} \frac{x^2+y^2}{\sqrt{x^2+y^2+1}-1}$

$= \frac{x^2+y^2\left(\sqrt{x^2+y^2+1}+1\right)}{\left(\sqrt{x^2+y^2+1}-1\right)\left(\sqrt{x^2+y^2+1}+1\right)}$

$= \sqrt{x^2+y^2+1}+1 = \sqrt{0^2+0^2+1}+1$

$= 2$

Questão 3

a) $f(x,y)\ \sqrt{y-x-2}$

$\sqrt{y-x-2} \geq 0$

$y-x-2 \geq 0$

$y-x \geq 2$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / \ y-x \geq 2\}}$

b) $f(x,y) = \ln(x^2+y^2-4)$

$x^2+y^2-4 > 0$

$x^2+y^2 > 4$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / x^2+y^2 > 4\}}$

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

$(y-x)(y-x^3) \neq 0$

$y^2 - x^3y + xy - x^4 \neq 0$

$y^2 - x^3y + xy - x^4 \neq 0$

$\cancel{y^2 + xy \neq - xy - x^3y}$

$y^2 + xy \neq x^4 - x^3y$

$\boxed{D = \{(x,y) \in \mathbb{R} / \ y^2+xy \neq x^4 - x^3y\}}$

d) $f(x,y)\ \dfrac{1}{\ln(-x^2-y^2+4)}$

$-x^2-y^2+4 > 0$

$-x^2-y^2 > -4 \quad (-1)$

$x^2+y^2 > 4$

$\boxed{D = \{(x,y) \in \mathbb{R} \setminus x^2+y^2 > 4\}}$

e) $f(x,y) = \dfrac{\operatorname{sen}(x,y)}{x^2+y^2-25}$

$x^2+y^2-25 \neq 0$

$x^2+y^2 \neq 25$

$x^2+y^2 \neq \pm 5$

$\boxed{D = \{(x,y) \in \mathbb{R} \setminus x^2+y^2 \neq \pm 5\}}$

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

$xy \neq 0 \Rightarrow x \neq y$

$\boxed{D = \{(x,y) \in \mathbb{R} \setminus x \neq y\}}$

Questão 3

calcula as imagens

$f(1, 2)$

$f(x,y) = \sqrt{y-x-2}$

$= \sqrt{2-1-2}$

$= \sqrt{-1}$ não existe

b) $f(x,y) = \ln(x^2+y^2-4)$

$= \ln(1^2+2^2-4)$

$= \ln(1+4-4)$

$= \ln(1)$

$= 0$

c) $f(x,y) = \frac{(x-1)(y+2)}{(y-x)(y-x^3)}$

$= \frac{(1-1)(2+2)}{(2-1)(2-1^3)} = \frac{0}{1}$

$= 0$

d) $f(x,y) = \frac{1}{\ln(-x^2-y^2+4}$

$= \frac{1}{\ln(-1^2-2^2+4)}$

$= \frac{1}{\ln(-1-4+4)} = \frac{1}{\ln(-1)}$

= não existe

E)

$f(x,y) = \frac{sen(x,y)}{x^2+y^2-25}$

$= \frac{sen(1 \cdot 2)}{1^2+2^2-25} = \frac{sen(3)}{1+4-25}$

$= \frac{sen(3)}{-20} = -0,002$

f) $(x,y)\ \frac{1}{xy} = \frac{1}{1 \cdot 2} = \frac{1}{2}$

questão 4

a) $\lim\limits_{(x,y)\to(0,1)} \dfrac{x - xy + 1}{x^2y + 5xy - y + 2}$

$= \lim\limits_{(x,y)\to(0,1)} \dfrac{0 - 0\cdot 1 + 1}{0^2\cdot 1 + 5\cdot 0\cdot 1 - 1 + 2}$

$= 1$

b) $\lim\limits_{(x,y)\to(4,4)} \operatorname{arctg} \dfrac{y}{x}$

$= \operatorname{arc\,tg}\left(\dfrac{4}{4}\right):$

$\operatorname{arc\,tg}\left(\dfrac{4}{4}\right) : \dfrac{\pi}{4}$

$\boxed{\lim\limits_{(x,y)\to(4,4)} = \dfrac{\pi}{4}}$

c) $\lim\limits_{(x,y)\to(1,0)} \dfrac{x^2(e^y - 1)}{y}$

$y = x$

$= \dfrac{\cancel{x^2}(e^x - 1)}{\cancel{x}}$

$= x(e^x - 1)$

$= 1(e^1 - 1) = 1{,}71$

$y = x^2$

$\dfrac{x^2(e^{x^2} - 1)}{x^2}$

$= e^{x^2} - 1$

$= e^1 - 1 = 1{,}71$

Exo 5

$$\lim_{(x,y)\to(0,0)} \frac{1}{x^2+y^2}$$

$y=x$

$$\lim_{(x,y)\to(0,0)} = \frac{1}{x^2+x^2}$$

$$= \frac{1}{x^2(1+1)} = \frac{1}{0} = \infty$$

$y=x^2$

$$= \frac{1}{x^2+x^4} = \frac{1}{0^2+0^4} = \frac{1}{0}$$

$$= \infty$$

3) $$\lim_{(x,y)\to(0,0)} \frac{x^3y}{2x^6+y^2}$$

$y=x$

$$= \frac{x^3\cdot x}{2x^6+x^2} = \frac{x^4}{2x^6+x^2}$$

$$= \cancel{\frac{2x^3}{2x^3(2x\ldots)}}$$

$$= \frac{x^4}{x^2(2x^4+1)} = \frac{x^2}{2x^4+1}$$

$$= \frac{0^2}{2\cdot 0^4+1} = \frac{0}{1} = 0$$

$y=x^2$

$$= \frac{x^3\cdot x^2}{2x^6+x^4} = \frac{x^5}{2x^6+x^4}$$

$$= \frac{x^5}{x^4(2x^2+1)} = \frac{x}{2x^2+1} = \frac{0}{2\cdot 0^2+1}$$

$$= 0$$

D) $$\lim_{(x,y)\to(0,0)} \frac{x+y}{2x^2+y^2}$$

$y=x$

$$= \frac{x+x}{2x^2+x^2} = \frac{2x}{x^2(2x+1)} = \frac{2}{0} = \infty$$

$y=x^2$

$$= \frac{x+x^2}{2x^2+x^4} = \frac{2x^2}{2x^2+x^4} = \frac{x^2(2)}{x^2(2+x^2)}$$

$$\frac{2}{2+x^2} = \frac{2}{2+0} = 1$$

E) $$\frac{x+y-4}{\sqrt{x+y}-2}$$

$y=x$

$$= \frac{x+x-4}{\sqrt{x+x}-2} = \frac{2x-4}{\sqrt{2x}-2}$$

$$= \frac{2\cdot 0-4}{\sqrt{2\cdot 0}-2} = \frac{-4}{-2} = 2$$

$y=x^2$

$$\frac{x+x^2-4}{\sqrt{x+x^2}-2} = \frac{2x^2-4}{\sqrt{2x^2}-2} = \frac{2\cdot 0^2-4}{\sqrt{2\cdot 0^2}-2}$$

$$= \frac{-4}{-2} = 2$$

questão 6

	Numeros de anos			
Taxa	5	10	15	20
0,02	4	2	1,33	1
0,04	8	4	2,66	2
0,06	12	6	4	3
0,08	16	8	5,33	4