Nome: Kerby Lovince

Questão 3

b) $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^3}{x^2+y^2}$

$y = x$

$\lim \dfrac{x^3}{x^2+x^2} = \dfrac{x^3}{x^2(1+1)}$

$= \dfrac{x}{1+1}$

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

2º cominho

$y = x^2$

$= \dfrac{x^3}{x^2+x^4} = \dfrac{x^3}{x^2(1+x^2)}$

$= \dfrac{x}{1+x^2}$

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

é continua em $(0,0)$

c) $\lim\limits_{(x,y)\to(0,0)} \dfrac{3yx^2}{x^3+y}$

$\dfrac{3yx^2}{x^3+y}$ $\quad y = x$

$\dfrac{3x\cdot x^2}{x^3+x} = \dfrac{3x^3}{x^3+x} = \dfrac{3x^3}{x(x^2+1)}$

$= \dfrac{3x^2}{x^2+1}$

$\lim\limits_{(x,y)\to(0,0)} = \dfrac{3\cdot 0^2}{0^2+1} = \dfrac{0}{1} = 0$

2º cominho

$y = x^2$

$\dfrac{3yx^2}{x^3+y} = \dfrac{3x^2\cdot x^2}{x^3+x^2}$

$= \dfrac{3x^4}{x^3+x^2} = \dfrac{3x^4}{x^2(x+1)}$

$= \dfrac{3x^2}{x+1}$

$\lim\limits_{(x,y)(0,0)} \dfrac{3\cdot 0^2}{0+1} = \dfrac{0}{1} = 0$

é continua em $(0,0)$

d) $\lim\limits_{(x,y)\to(0,0)} \dfrac{3x^2-y^2+5}{x^2+y^2+2}$

$y = x$

$$\frac{3x^2-x^2+5}{x^2+x^2+2}$$

$$\frac{3\cdot 0^2-0^2+5}{0^2+0^2+2} = \frac{5}{2}$$

$y = x^2$

$$\frac{3x^2-y^2+5}{x^2+y^2+2}$$

$$\lim_{(x,y)(0,0)} = \frac{3x^2-\cancel{x^4}+5}{x^2+x^4+2}$$

$$\lim_{(x,y)(0,0)} \frac{3\cdot 0^2-0^4+5}{0^2+0^4+2} = \frac{5}{2}$$

e) $x\cdot \operatorname{sen}\left(\dfrac{1}{x^2+y^2}\right)$

$y=x$

$$\frac{x\cdot \operatorname{sen} 1}{x^2+x^2} = \frac{\cancel{x}\cdot \operatorname{sen} 1}{2x^{\cancel{2}}} = \frac{\operatorname{sen} 1}{2x}$$

$$\frac{\operatorname{sen} 1}{2\times 0} = \frac{\operatorname{sen} 1}{0} \ ?$$

$y = x^2$

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

$$\frac{\operatorname{sen} 1}{0(1+0^2)} = \frac{\operatorname{sen} 1}{0} \ ?$$

Questão 2

$\lim\limits_{(x,y)\to(0,0)} \dfrac{x^2\cdot y^3}{x^3+y}$

$y=x$

$$\frac{x^2\cdot x^3}{x^3+x} = \frac{x^5}{x(x^2+1)}$$

$$= \frac{\cancel{x^5}\, x^4}{x^2+1}$$

$$\lim_{(x,y)(0,0)} = \frac{0^4}{0^2+1} = \frac{0}{1} = 0$$

$y = x^2$

$$\frac{x^2\cdot x^6}{x^3+x^2} = \frac{x^8}{x^2(x+1)}$$

$$= \frac{x^6}{x+1}$$

$$\lim_{(x,y)(0,0)} = \frac{0^6}{0+1} = \frac{0}{1}$$

neste caso o limite existe
ele continuo em (0,0)

Questão 5

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

$x+y-1 \geq 0$

$x+y \geq 1$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / x+y \geq 1\}}$

d) $f(x,y) = \dfrac{\ln x}{x-1}$

$x-1 \neq 0$

$x \neq 1$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / x-1 \neq 0\}}$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / x \neq 1\}}$

c) $f(x,y) = \ln(x^2 - y + 1)$

$x^2 - y + 1 > 0$

$x^2 - y > -1$

Neste caso o domínio não existe

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

$2x-y+1 \neq 0$

$2x-y \neq -1$

$\boxed{D = \{(x,y) \in \mathbb{R}^2 / 2x-y \neq -1\}}$

Questão 4

$f(x,y) = \dfrac{3x}{y-x}$

a) $f(1,2)$

$f(1,2) = \dfrac{3 \cdot 1}{2-1} = 3$

b)

$f(3,7) = \dfrac{3 \cdot 3}{-7-3} = \dfrac{9}{-10}$

c)

$f(1,-1) = \dfrac{3 \cdot 1}{-1-1} = \dfrac{3}{-2} = -\dfrac{3}{2}$

d) O domínio da função é

$y - x \neq 0$

$-x \neq -y \quad x(-1)$

$x \neq y$

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

Questão 7

$f(x, y) = y - x$

a)

$y - x = 0$

$-x = -y \quad (-1)$

$x = y$

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