cálculo 2, stewart vol. 2, ed 8, cap 14.2

5 $\lim_{(x,y)\to(3,2)} (x^2y^3 - 4y^2) = 3^2 \cdot 2^3 - 4 \cdot 2^2 = 56$

7 $\lim_{(x,y)\to(\pi,\pi/2)} y \cdot \operatorname{sen}(x-y) = \pi/2 \cdot \operatorname{sen}(\pi/2) = \pi/2$

9 para $x = 0$

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

$\lim_{(0,y^-)\to(0,0)} \to \lim_{y^-\to 0} \frac{-4\cancel{y^2}}{2\cancel{y^2}} = -2$

para $y = 0$

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

não existe

11 $\lim_{(x,y)\to(0,0)} \frac{y^2 \operatorname{sen}^2 x}{x^2 + 2y^2}$

para $x = 0$

$\lim_{(0,y)\to(0,0)} \frac{\cancel{y^2 \operatorname{sen}^2 0}}{2y^2} \to \lim_{y^+\to 0} \frac{0}{2y^2} = 0 = \lim_{y^-\to 0} \frac{0}{2y^2}$

para $y = 0$

$\lim_{(x,0)\to(0,0)} \frac{0 \cdot \operatorname{sen}^2 x}{x^2} \to \lim_{x\to 0} \frac{0}{x^2} = 0$

13 $\lim_{(x,y)\to(0,0)} \frac{xy}{\sqrt{x^2 + y^2}}$ $\begin{cases} x = r\cos\theta \\ y = r \operatorname{sen}\theta \end{cases}$

$\lim_{r\to 0} \frac{r\cos\theta \cdot r\operatorname{sen}\theta}{\sqrt{r^2 \cdot \cos^2\theta + r^2 \operatorname{sen}^2\theta}} = \lim_{r\to 0} \frac{r^{\cancel{2}} \cdot \cos\theta \cdot \operatorname{sen}\theta}{\cancel{\sqrt{r^2}} \cdot \underbrace{\sqrt{\cos^2\theta + \operatorname{sen}^2\theta}}_{=1}} = \lim_{r\to 0} r \cdot \cos\theta \operatorname{sen}\theta = 0$

15 $\lim\limits_{(x,y)\to(0,0)} \dfrac{xy^2 \cos y}{x^2+y^4}$ não existe

para $x=0$ $\lim\limits_{y\to 0} \dfrac{0}{y^4} = 0$

para $x=y^2$ $\lim\limits_{(y^2,y)\to(0,0)} \dfrac{y^2y^2\cos y}{y^4+y^4} = \lim\limits_{y\to 0} \dfrac{\cancel{y^4}\cos y}{2\cancel{y^4}} = \dfrac{\cos 0}{2} = \dfrac{1}{2}$

17 $\lim\limits_{(x,y)\to(0,0)} \dfrac{x^2+y^2}{\left(\sqrt{x^2+y^2+1}\right)-1}$, $\begin{cases} x = r\cos\theta \\ y = r\,\text{sen}\,\theta \end{cases}$

$\to \lim\limits_{r\to 0} \dfrac{r^2\cos^2\theta + r^2\,\text{sen}^2\theta}{\sqrt{r^2\cos^2\theta + r^2\,\text{sen}^2\theta + 1} - 1} = \lim\limits_{r\to 0} \dfrac{r^2\cdot(\underbrace{\text{sen}^2\theta+\cos^2\theta}_{1})}{\sqrt{r^2\cdot(\text{sen}^2\theta+\cos^2\theta)+1}-1}$

$= \lim\limits_{r\to 0} \dfrac{r^2}{\sqrt{r^2+1}-1} \overset{L.H.}{=} \lim\limits_{r\to 0} \dfrac{2r}{\frac{1}{\cancel{2}\sqrt{r^2+1}}\cdot\cancel{2}r} = \lim\limits_{r\to 0} \dfrac{2r}{\frac{r}{\sqrt{r^2+1}}}$

$= \lim\limits_{r\to 0} \dfrac{2\cancel{r}\cdot\sqrt{r^2+1}}{\cancel{r}} = 2\cdot\sqrt{1} = 2$

29 $F(x,y) = \dfrac{xy}{1+e^{x-y}}$ $1+e^{x-y} \neq 0$ $e^{x-y} \neq -1$ e^{x-y} nunca será $=-1$ pois $e^{x-y} \geq 0$

é contínua em todo domínio

31 $F(x,y) = \dfrac{1+x^2+y^2}{1-x^2-y^2}$ $1-x^2-y^2 \neq 0$ $1 \neq x^2+y^2$

33 $G(x,y) = \sqrt{x} + \sqrt{1-x^2-y^2}$ $1-x^2-y^2 \geq 0$ $1 \geq x^2+y^2$

$x \geq 0$ e $x^2+y^2 \leq 1$

35 $f(x,y,z) = \text{arcsen}\,(x^2+y^2+z^2)$

$x^2+y^2+z^2 \leq 1$