

Lista 5 - MAT-2454

(I) Calcule, caso exista:

$$(1) \lim_{(x,y) \rightarrow (0,0)} x \cdot \text{sen}\left(\frac{1}{x^2 + y^2}\right)$$

$$(2) \lim_{(x,y) \rightarrow (0,0)} \frac{x}{\sqrt{x^2 + y^2}}$$

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

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

$$(5) \lim_{(x,y) \rightarrow (0,0)} \frac{x + 2y}{3x - y}$$

$$(6) \lim_{(x,y) \rightarrow (0,0)} \frac{xy(c - y)}{x^4 + y^4}$$

$$(7) \lim_{(x,y) \rightarrow (0,0)} \frac{xy}{y - x^3}$$

$$(8) \lim_{(x,y) \rightarrow (0,0)} \frac{x^2}{x^2 + y^2} \text{sen}\left(\frac{y^2}{\sqrt{x^2 + y^2}}\right)$$

$$(9) \lim_{(x,y) \rightarrow (0,0)} \frac{4xy + 8x^2 + y^2}{5x^2 + 9y^2}$$

$$(10) \lim_{(x,y) \rightarrow (0,0)} \frac{xy^2}{x^2 - y^2}$$

(II) Estude a continuidade das seguintes funções:

$$(a) f(x, y) = 2x^4y^2 - 9x + 3y + 1$$

$$(b) g(x, y) = \frac{x^2 + y^4}{2x^2 + 7y^2 + 3}$$

$$(c) h(x, y) = \frac{xy}{x^2 + y^2}$$

$$(d) f(x, y) = \begin{cases} \frac{xy}{x^2 + y^2} & \text{se } (x, y) \neq (0, 0) \\ 0 & \text{se } (x, y) = (0, 0) \end{cases}$$

$$(e) f(x, y) = \begin{cases} \frac{(x-2)(y-1)^2}{4(x-2)^2 + 3(y+1)^2} + 2x + y & \text{se } (x, y) \neq (2, -1) \\ 3 & \text{se } (x, y) = (2, -1) \end{cases}$$

$$(f) u(x, y) = \begin{cases} \frac{\text{sen}(3x^2 + 4y^2)}{3x^2 + 4y^2} + 3x + y & \text{se } (x, y) \neq (0, 0) \\ 1 & \text{se } (x, y) = (0, 0) \end{cases}$$