

Ex 2

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$$\lim_{(x,y) \rightarrow (3,2)} \frac{(x-3)^2 (\cos(\pi x) - 1)}{(x-3)^2 + 2x^2(y-2)^2}$$

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

$$g(x) = \cos(\pi x) - 1 \xrightarrow{x \rightarrow 3} -2$$

$$\lim_{(x,y) \rightarrow (3,2)} \frac{(x-3)^2}{(x-3)^2 + 2x^2(y-2)^2} = \lim_{(u,v) \rightarrow (0,0)} \frac{u^2}{u^2 + 2(u+3)^2 v^2}$$

$$u = x - 3$$

$$v = y - 2$$

$$= \lim_{(u,v) \rightarrow (0,0)} \frac{u^2}{u^2 + 2u^2 v^2 + 6uv^2 + 18v^2} = \text{non existe, es falso}$$

Pseudo $u=v$ $\lim_{u \rightarrow 0} \frac{u^2}{u^2 + 2u^2 + 6u^2 + 18v^2} = \frac{1}{19}$

$\sqrt{u}=v$ $\lim_{u \rightarrow 0} \frac{u^2}{u^2 + 2u^3 + 6u^2 + 18u} = 0$

\Rightarrow ie existe non existe