1. $\lim_{(x,y)\to(0,0)} \frac{(x-1)^2 \sin\left(x^2\right) y}{x^2+y^4}$

   $f(x,y) = \frac{(x-1)^2 \sin\left(x^2\right) y}{x^2+y^4}$

   QvQ $\exists g(x,y) : lim_{(x,y)\to(0,0)} g(x,y) = 0 \wedge 0 \leq |f(x,y)| \leq g(x,y)$

   $|\frac{(x-1)^2 \sin\left(x^2\right) y}{x^2+y^4}| =$

   $\frac{(x-1)^2 |\sin\left(x^2\right)||y|}{x^2+y^4} \overset{|\sin(k)| \overset{k\to 0}{\leq} |k|}{\leq}$

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

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

   $\frac{x^2}{x^2+y^4}(x-1)^2|y|$

   $y^4 \leq 0 \Rightarrow x^2+y^4 \leq x^2 \Rightarrow 1 \leq \frac{x^2}{x^2+y^4} : \star$

   $\frac{x^2}{x^2+y^4}(x-1)^2|y| \overset{\star}{\leq}$

   $(x-1)^2|y| \overset{(x,y)\to(0,0)}{\to 0} \Rightarrow$

   $g(x,y) = (x-1)^2|y|$

   $0 \leq |f(x,y)| \overset{(x,y)\to 0 \Rightarrow \to 0}{\leq (x-1)^2|y|}$

   $\Rightarrow$ por sandwich $|f(x,y)| \to 0$ cuando $(x,y) \to 0$

   $\Rightarrow \lim_{(x,y)\to(0,0)} \frac{(x-1)^2 \sin\left(x^2\right) y}{x^2+y^4} = 0$

2. $\lim_{(x,y)\to(0,0)} \frac{e^{xy}-1}{x^2+y^2} = L_2$

   - $y = 0 \Rightarrow \lim_{x\to 0} \frac{e^{x0}-1}{x^2} =$
     $\lim_{x\to 0} \frac{0}{x^2} = 0$

   - $y = x \Rightarrow \lim_{x\to 0} \frac{e^{x^2}-1}{2x^2} \overset{\text{"}\frac{0}{0}\ por\ LH\text{"}}{=}$

     $\lim x \to 0 \frac{2\cancel{x}e^{x^2}}{4\cancel{x}} \overset{e^{x^2}\to 1}{=} \frac{1}{2}$

   $\frac{1}{2} \neq 0 \Rightarrow \nexists L_2$