1. $\lim_{(x,y)\to(7,2)} x^2+y^2-xy$
   $7^2+2^4-(7\cdot 2)=39$

2. $\lim_{(x,y)\to(0,1)} xe^{xy}$
   $0\cdot 1=0$

3. $\lim_{(x,y)\to(2,1)} \frac{4-xy}{x^2+3y^2}$
   $\frac{4-2}{4+3(1)}=\frac{2}{7}$

4. $\lim_{(x,y)\to(0,0)} = \frac{x-y}{x+y}$
   $\lim_{x\to 0} f(x,0)=1$
   $\lim_{y\to 0} f(0,y)=-1$
   $\Rightarrow Por\ curvas \nexists L$

5. $\lim_{(x,y)\to(0,0)} = \frac{x^4-4y^2}{x^2+2y^2}$
   $\lim_{x\to 0} f(x,0)=0$
   $\lim_{y\to 0} f(0,y)=-2$
   $\Rightarrow Por\ curvas \nexists L$

6. $\lim_{(x,y)\to(0,0)} = \frac{xy}{x^2+y^2}$
   $\lim_{x\to 0} f(x,0)=0$
   $\lim_{y\to 0} f(0,y)=0$
   $\lim_{y\to 0} f(x,x)=\frac{1}{2}$
   $\Rightarrow Por\ curvas \nexists L$

7. $\lim_{(x,y)\to(1,0)} = \frac{xy-y}{(x-1)^2+y^2}$
   $\lim_{x\to 1} f(x,0)=0$
   $\lim_{y\to 0} f(0,y)=0$
   $\lim_{x\to 1} f(x,x)=\frac{x(x-1)}{(x-1)^2+x^2}=0$
   $\lim_{x\to 1} f(x,(x-1))=\frac{(x-1)^2}{2(x-1)^2}=\frac{1}{2}$
   $\Rightarrow Por\ curvas \nexists L$

8. $\lim_{(x,y)\to(0,0)} = \frac{xy}{\sqrt{x^2+y^2}}$
   $\lim_{x\to 0} f(x,0)=0$
   $\lim_{y\to 0} f(0,y)=0$
   Sospecho que $L=0$, lo pruebo por definición
   $\|(x,y)\| < \delta \Rightarrow |\frac{xy}{\sqrt{x^2+y^2}}| < \epsilon$

   - $|x| \le \|(x,y)\| < \delta$
   - $|y| \le \|(x,y)\| < \delta$

   $|\frac{xy}{\sqrt{x^2+y^2}}| =$
   $\frac{|y||y|}{\sqrt{x^2+y^2}} =$
   $\frac{|y||y|}{\sqrt{x^2+y^2}} =$
   $\frac{|y||y|}{\|(x,y)\|} \le$
   $\frac{\|(x,y)\|\|(x,y)\|}{\|(x,y)\|} =$
   $\|(x,y)\| \le \delta \Rightarrow \delta = \epsilon \blacksquare$

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

   $\frac{x^4-y^4}{x^2+y^2} =$

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

   x^2+y^2

   $(x,y)\to(0,0) \Rightarrow x^2+y^2\to 0 \quad \blacksquare$

10. $\lim_{(x,y)\to(0,0)} = \frac{y^2\sin^2(x)}{x^4+2y^4}$

    $\lim_{x\to 0} f(x,0) = 0$

    $\lim_{y\to 0} f(0,y) = 0$

    $\lim_{x\to 0} f(x,x) = \lim_{x\to 0} \frac{x^2\sin^2(x)}{x^4+2x^4} =$

    $\lim_{x\to 0} \frac{x^2\sin^2(x)}{3x^4} =$

    $\lim_{x\to 0} \frac{\cancel{x^2}}{3\cancel{x^2}} \cdot \overset{\to 1}{\frac{\sin(x)}{x}} \cdot \overset{\to 1}{\frac{\sin(x)}{x}} = \frac{1}{3}$

    $\Rightarrow \nexists L$

11. $\lim_{(x,y)\to(0,3)} \frac{x^2(y-3)^2e^x}{x^2+(y-3)^2}$

    - $\lim_{x\to 0} f(x,0) = \lim_{x\to 0} \frac{x^2(-3)^2e^x}{x^2+(-3)^2} = 0$
    - $\lim_{y\to 3} f(0,y) = \lim_{y\to 3} \frac{0}{(y-3)^2} = 0$
    - $\lim_{y\to 3} f(y-3,y) = \lim_{y\to 3} \frac{\cancel{(y-3)^2}(y-3)^2e^{y-3}}{2\cancel{(y-3)^2}} =$

      $\lim_{y\to 3} \frac{\overset{\to 0}{(y-3)^2}\overset{\to 1}{e^{y-3}}}{2} = 0$

    Sospecho que $L = 0$ pruebo por definición

    $\|(x,y-3)\| < \delta \Rightarrow |\frac{x^2(y-3)^2e^x}{x^2+(y-3)^2}| < \epsilon$

    - $|x| \le \|(x,y-3)\| < \delta$
    - $|y-3| \le \|(x,y-3)\| < \delta$

    $|\frac{x^2(y-3)^2e^x}{x^2+(y-3)^2}| =$

    $\frac{|x^2(y-3)^2e^x|}{x^2+(y-3)^2} =$

    $\frac{x^2(y-3)^2|e^x|}{x^2+(y-3)^2} \overset{x\to 0\Rightarrow e^x\to 1}{=}$

    $\frac{x^2(y-3)^2}{x^2+(y-3)^2} \le$

    $\frac{\cancel{\|(x,y-3)\|^2}\|(x,y-3)\|^2}{\cancel{\|(x,y-3)\|^2}} \overset{\delta<1}{\le}$

    $\delta = \epsilon \Rightarrow$

    $\delta = \min(1,\epsilon) \quad \blacksquare$