$P_2(x,y) = 1 - x^2 - y^2 + R_2(x,y)$

$\lim_{(x,y)\to(0,0)} \frac{f(x,y)+x^2+y^2-1}{x^2+y^2} \equiv$

$\lim_{(x,y)\to(0,0)} \frac{P_2(x,y)+x^2+y^2-1}{x^2+y^2} \equiv$

$\lim_{(x,y)\to(0,0)} \frac{\cancel{1-x^2-y^2}+R_2(x,y)\cancel{+x^2+y^2-1}}{x^2+y^2} \equiv$

$\lim_{(x,y)\to(0,0)} \frac{R_2(x,y)}{x^2+y^2} \equiv$

$\lim_{(x,y)\to(0,0)} \frac{R_2(x,y)}{\|(x,y)\|^2} = 0$