# Finding Limits

Find the value of the limit, if it exists. Otherwise, prove that the limit doesn't exist.

(a) $\lim\limits_{\substack{x\to 1\\ y\to -1}} \dfrac{xy}{x+y+1}$

(b) $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{x^2}{x^2+y^2}$

(c) $\lim\limits_{\substack{x\to 0\\ y\to 0}} \dfrac{(x+1)\sin y}{y}$

(d) $\lim\limits_{\substack{x\to 0\\ y\to 0}} e^{x^2+y^2}$

(e) $\lim\limits_{\substack{x\to 0\\ y\to 0}} e^{-\frac{1}{x^2+y^2}}$

(f) Let $f(x,y) = \frac{x}{x-y}$ when $x \neq y$ and $f(x,x) = 0$. $\lim\limits_{\substack{x\to 0\\ y\to 0}} f(x,y)$