Does the limit exist at the origin?

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

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

TABLE 1 Values of $f(x, y)$

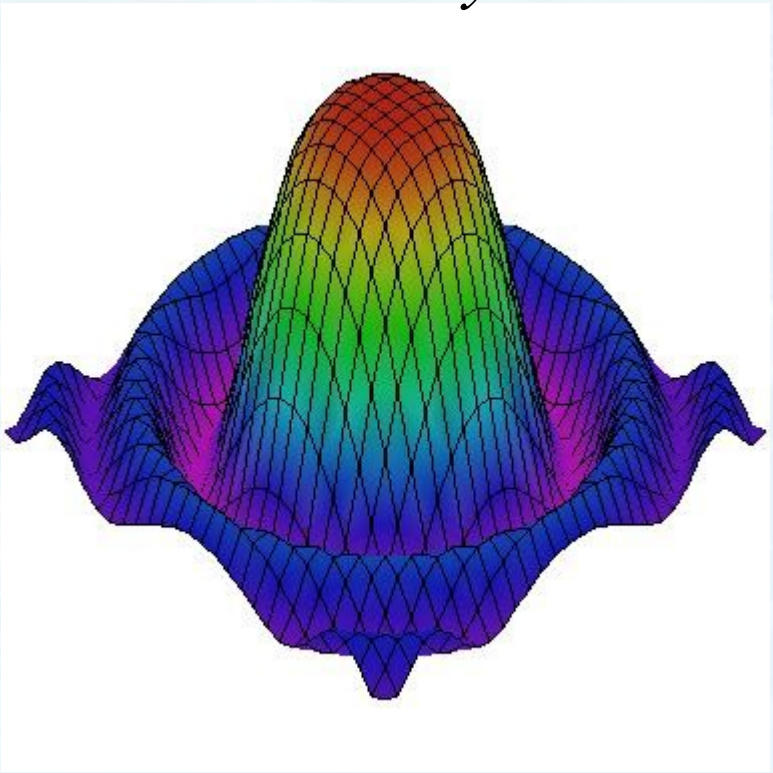
x \ y	−1.0	−0.5	−0.2	0	0.2	0.5	1.0
−1.0	0.455	0.759	0.829	0.841	0.829	0.759	0.455
−0.5	0.759	0.959	0.986	0.990	0.986	0.959	0.759
−0.2	0.829	0.986	0.999	1.000	0.999	0.986	0.829
0	0.841	0.990	1.000		1.000	0.990	0.841
0.2	0.829	0.986	0.999	1.000	0.999	0.986	0.829
0.5	0.759	0.959	0.986	0.990	0.986	0.959	0.759
1.0	0.455	0.759	0.829	0.841	0.829	0.759	0.455

TABLE 2 Values of $g(x, y)$

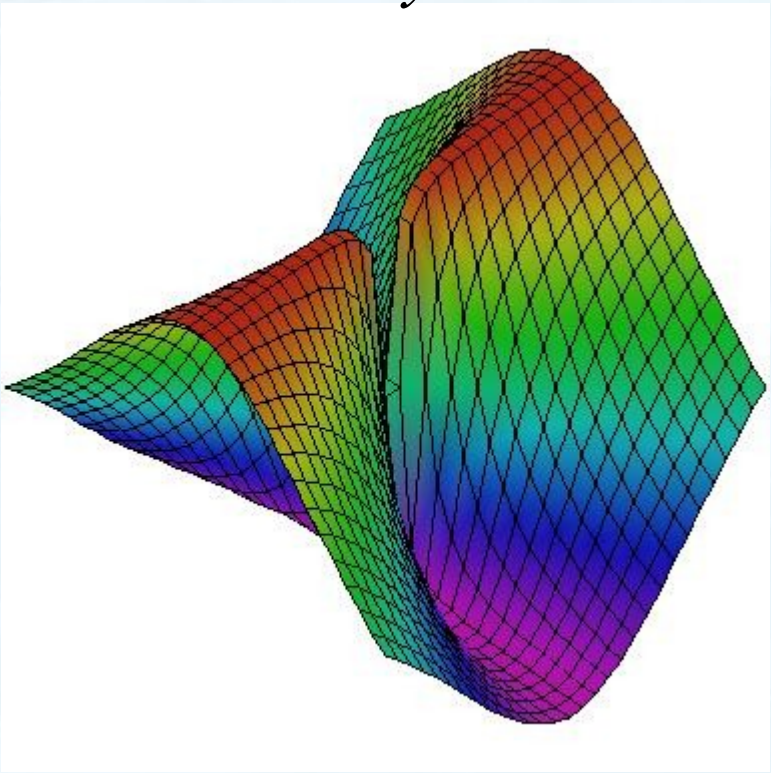
x \ y	−1.0	−0.5	−0.2	0	0.2	0.5	1.0
−1.0	0.000	0.600	0.923	1.000	0.923	0.600	0.000
−0.5	−0.600	0.000	0.724	1.000	0.724	0.000	−0.600
−0.2	−0.923	−0.724	0.000	1.000	0.000	−0.724	−0.923
0	−1.000	−1.000	−1.000		−1.000	−1.000	−1.000
0.2	−0.923	−0.724	0.000	1.000	0.000	−0.724	−0.923
0.5	−0.600	0.000	0.724	1.000	0.724	0.000	−0.600
1.0	0.000	0.600	0.923	1.000	0.923	0.600	0.000

Does the limit exist at each point shown?

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

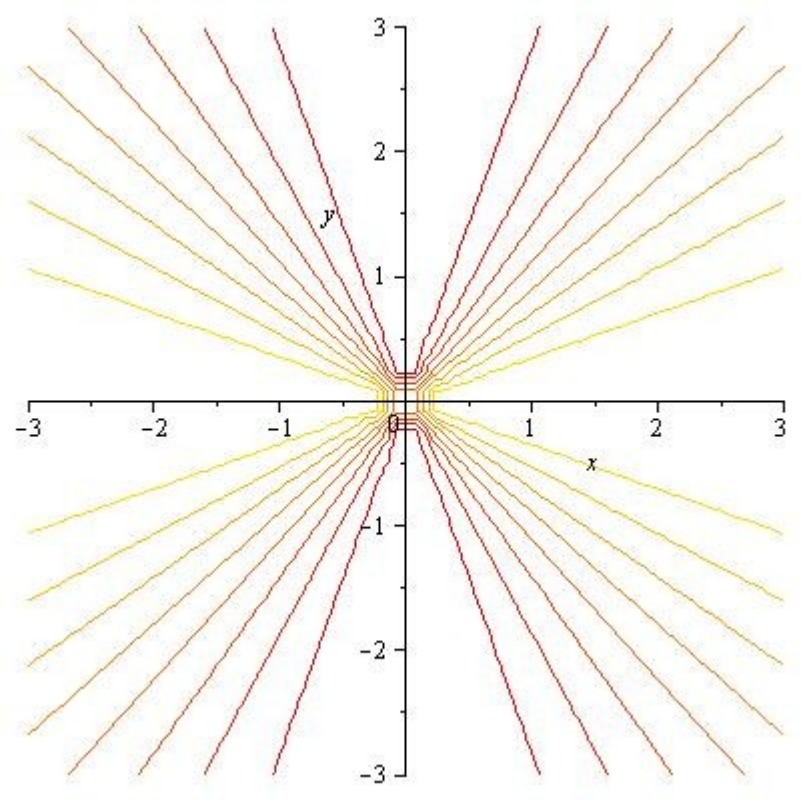


$$\frac{x^2-y^2}{x^2+y^2}$$

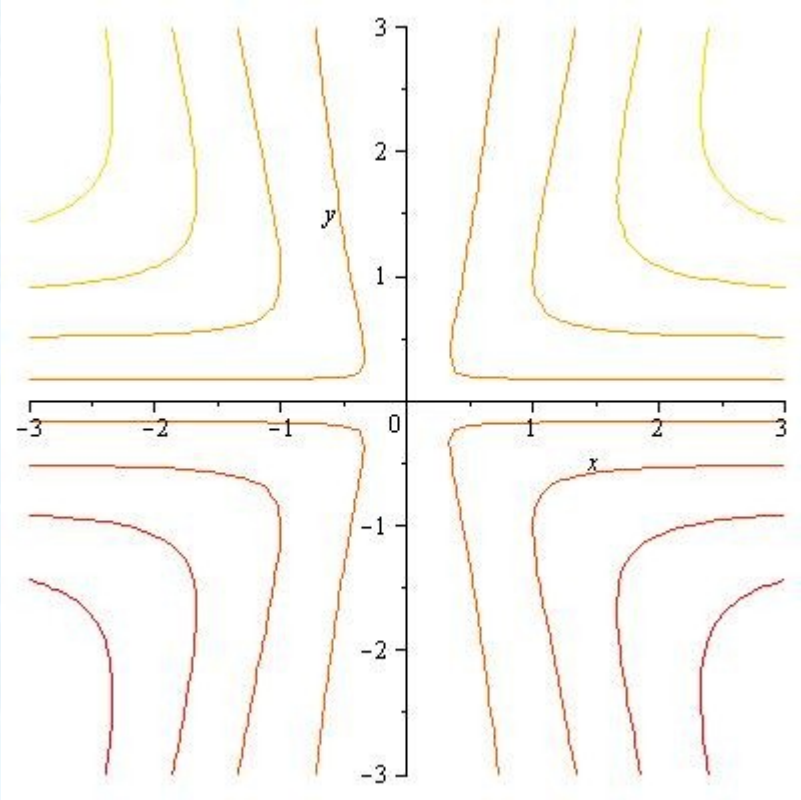


Contours: When to be suspicious

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

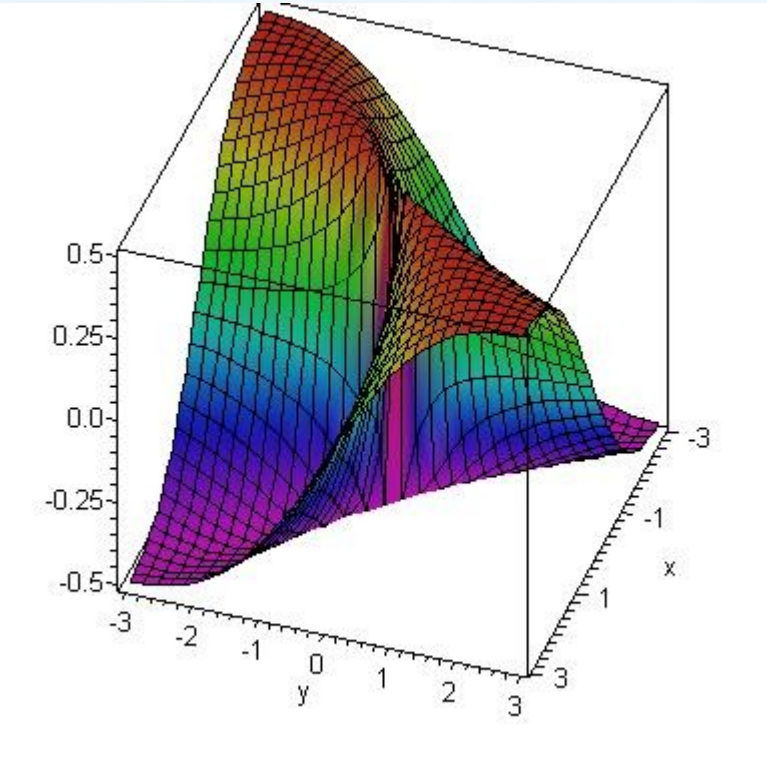


$$\frac{x^2 y}{x^2 + y^2}$$

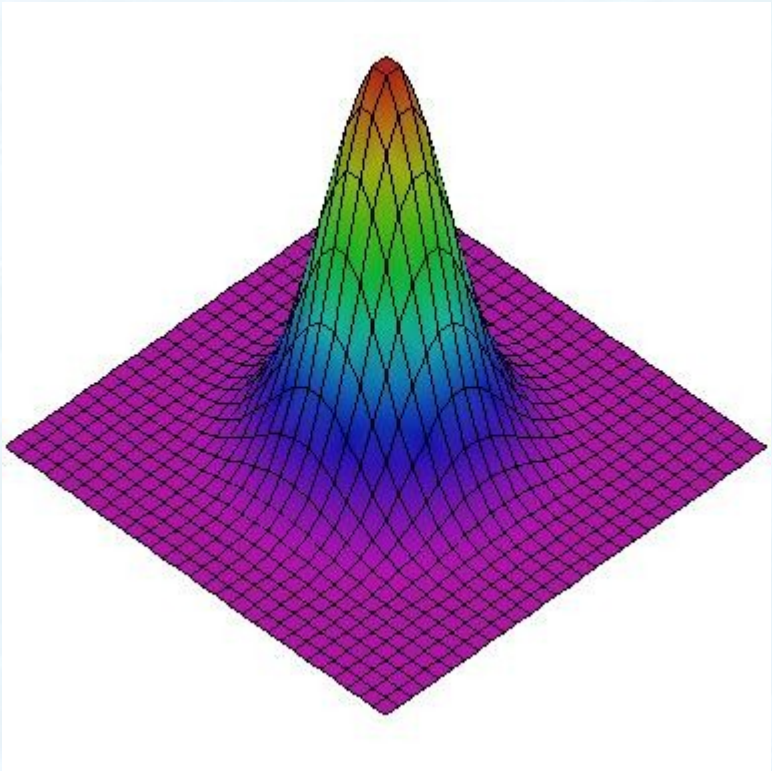


Does the limit exist at each point shown?

$$\frac{xy}{x^2+y^2}$$

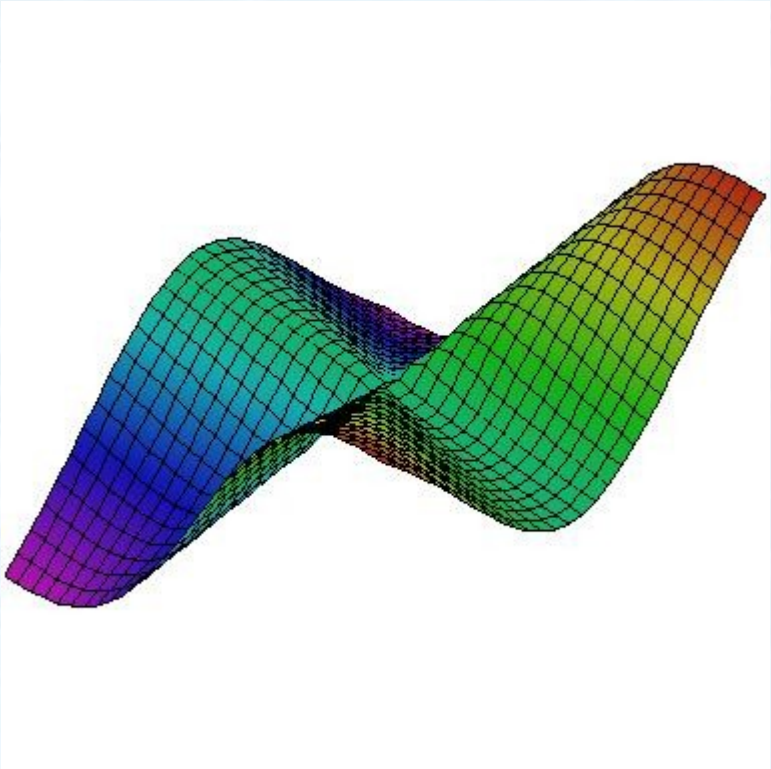


$$e^{-x^2-y^2}$$

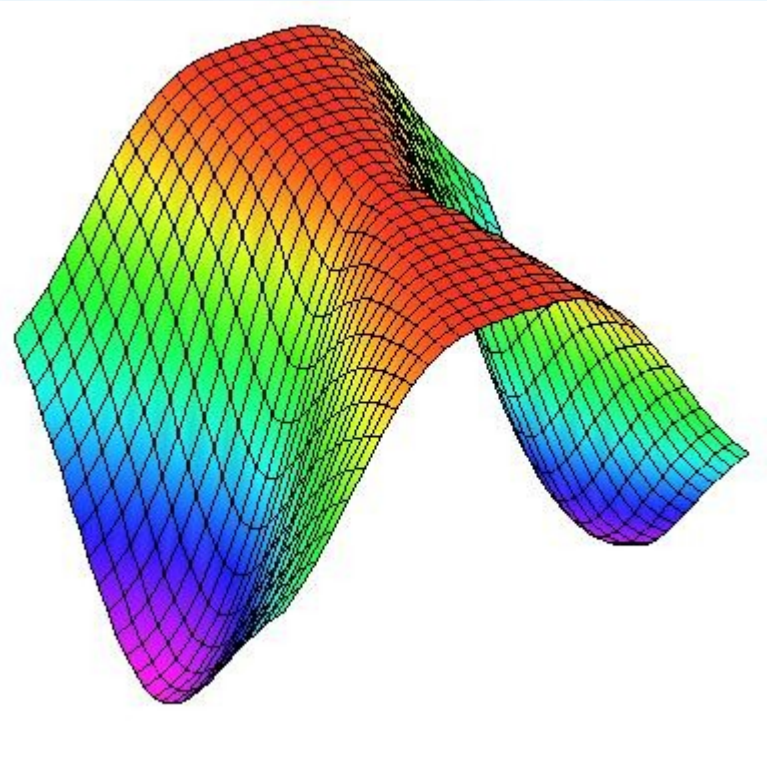


Does the limit exist at each point shown?

$$\frac{x^2 y}{x^2 + y^2}$$

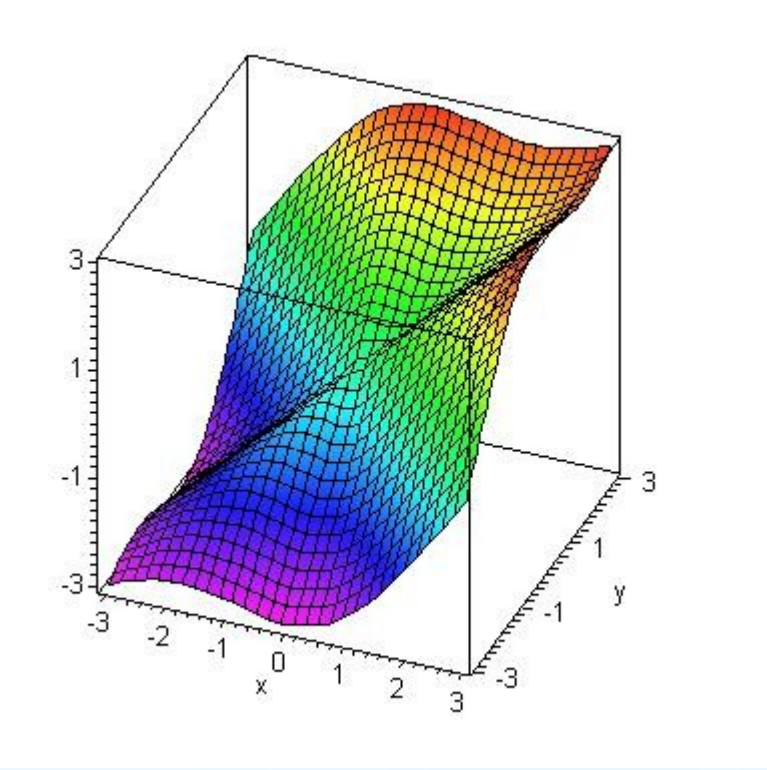


$$\frac{x^2 + \sin^2(y)}{2x^2 + y^2}$$



Does the limit exist at each point shown?

$$\frac{x^3+y^3}{x^2+y^2}$$



$$\frac{xy}{\sqrt{x^2+y^2}}$$