Here is the graph of $f(x, y) = \frac{1}{xy}$ with $|x| \leq 1$ and $|y| \leq 1$.
The z-axis is compressed to give a better view. The *domain*
of f is the whole xy-plane *except without* either the x-axis
or the y-axis. Do you see why? What is the *range* of f?