**Problem statement** The figure below shows some level curves of an unspecified function $f(x, y)$. These are curves of the form $f(x, y) = k$ for integer values of $k$ from 1 to 11. The tick-marks on the axes are one unit apart. The questions below refer only to the region inside the $k = 0$ curve. To help understand the diagram, note that the curves for $k = 4$ and $k = 8$ each intersect the $x$-axis twice at tick-marks.

a) Where is the quantity $\|\nabla f\|$ greatest? Approximately what is its value there? What is the direction of $\nabla f$ there?

b) Where is the quantity $\|\nabla f\|$ smallest? Approximately what is its value there? What is the direction of $\nabla f$ there?

c) Is $\nabla f(0, 4)$ more nearly parallel to $i + j$, $i - j$, or $-i + j$?