Homework 3 (Due Friday, June 20)

1. Finish Homework 2, if you have not already.

2. `Matlab` implements $J_0(x)$, the Bessel J-function of order zero, as `besselj(0,x)`. For instance, typing `besselj(0,1)` at the command prompt computes $J_0(1)$ as $0.7651\ldots$ Plot J_0 for $0 \leq x \leq 4$. On the same figure, plot the tangent line to the graph at $x = 2$. Note: This problem tests your conceptual understanding of Calculus I and programming skills, not your ability to Google strange functions of mathematical physics.

3. Let $f(x, y) = (x^2-1)\,(y^2-1)$ Produce a contour plot (with 30 contours) and a surface plot of f on the square $\{-2 \leq x, y \leq 2\}$. What do the plots tell you about the behavior of the function at the origin?