# Quiz 6

This is a two-stage quiz. During the first stage, use your knowledge & calculator. You have 15 min. In the second stage, you are now welcome to use your books, notes, and students in the class to retake the same quiz. You have the remainder of the quiz time to write one solution (with everyones name on it!!!) to be turned in for the group.

1. Consider the contour map of $f(x, y) = y \sin(x) + \cos(y)$ graphed on the xy plane where $-2\pi \leq x \leq 2\pi$ and $-1\pi \leq y \leq 2\pi$. Some multiples of $\frac{\pi}{2}$ are also plotted along the x and y axis. The contour lines are labeled by rainbow color where red is the highest and blue is the lowest.
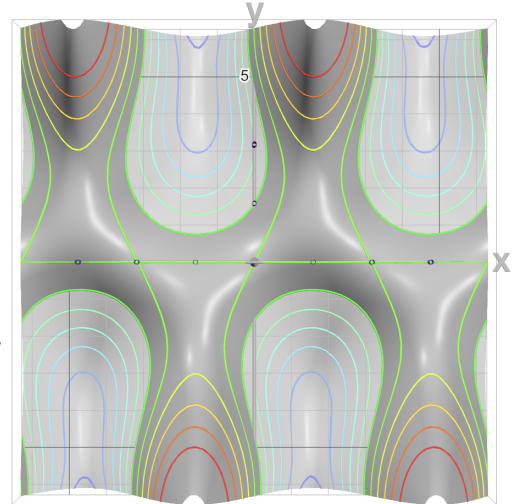
   (a) [2] Estimate the location of two critical points of f.

   (b) [2] Sketch the gradient vector $\nabla f(\pi, \pi)$.

   (c) [3] Find a linearization of f at (π, π).

2. [3] Say that we would like to find three numbers whose sum is 130 and whose produce is a maximum.

   (a) Identify the function needed to be maximized. Define any variables you create.

   (b) Box any systems of equations that would need to be solved to complete this problem.