Math 241 Project 2 **Due in Discussion on Tuesday 10/25/2011**

What to Submit:

For this project you will need to turn in a printout of your published m-file. See the guide for instructions on how to write an m-file (it's easy!) and how to publish it.

Note: Each of questions 1-3 and 5-8 should be done in a single Matlab entry. (The `view` command can be on a separate line though). The remaining questions can be broken up into several lines for neatness. In the m-file each numbered question should be separated by `%%` as the guide indicates.

1. Clear Matlab completely with `clear all`.
2. Plot the function $f(x,y) = \sqrt{x^2+y^2}$ with the view at $(10,10,10)$.
3. Plot the function $f(x,y) = \sqrt{9-x^2-y^2}$ with the view at $(10,10,10)$.
4. Plot the surface $y = 4 - x^2$ with the view at $(10,10,10)$.
5. Find $\frac{\partial}{\partial x}\left[x\sin(x^2y)\right]$
6. Find $\frac{\partial^2}{\partial x \partial y}\left[\frac{x^2-y}{x+y}\right]$
7. Find ∇f for $f(x,y) = x\ln(xy^2) + xy$.
8. Find $\nabla f(-1,0)$ for $f(x,y) = 5x^3y^2 - \frac{y}{x}$.
9. Find the directional derivative of $g(x,y) = x^2 + y^3$ at $(2,-2)$ in the direction of $\bar{a} = 2\,\hat{\imath} - 3\,\hat{\jmath}$.
10. Find all critical points for $f(x,y) = (y-2)\ln(xy)$. Remember that ln in Matlab is `log`. On your printout write the points as coordinate pairs next to the output.
11. Find all critical points for $f(x,y) = x^3 + y^3 - 6xy$. On your printout write the points as coordinate pairs next to the output.
12. Use Lagrange multipliers to find the maximum and minimum values of $f(x,y) = xy^2$ subject to the constraint $x^2 + y = 16$. On your printout write a neat summary next to the output.