Matlab Project 2 Tim Pilachowski's sections

The due date is provided on the course schedule.

Turn in a printout of your published m-file. See Justin's guide for instructions on how to write an m-file and how to publish it.

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.) 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.

While the points below add up to 26 points, Project 2 will graded out of 25. (In other words, there's a bonus point
built in.

1. (1 point) Clear Matlab completely with `clear all`.

2. (2 points) Plot the function $f(x, y) = \sqrt{x^2 + y^2}$ with the view at (10, 10, 10).

3. (2 points) Plot the function $f(x, y) = \sqrt{4 - x^2 - y^2}$ with the view at (10, 10, 10).

4. (2 points) Plot the surface $y = 9 - x^2$ with the view at (10, 10, 10).

5. (2 points) Given $f(x, y) = y\sin\left(x^2 y^3\right)$ find $\dfrac{\partial f}{\partial y}$.

6. (2 points) Given $f(x, y) = \dfrac{x^2 - y}{x + y}$ find $\dfrac{\partial^2 f}{\partial y \partial x}$.

7. (2 points) Given $f(x, y) = x\ln\left(xy^2\right) + xy$ find ∇f. (Remember that, in Matlab, the function "ln" is entered `log`.)

8. (2 points) Given $f(x, y) = 5x^3 y^2 - \dfrac{y}{x}$ find $\nabla f(-1, 0)$.

9. (2 points) Find the directional derivative of $f(x, y) = x^3 + y^2$ at (–2, 2) in the direction of $\vec{a} = 3\vec{i} + 2\vec{j}$.

10. (3 points) Find all critical points for $f(x, y) = (y - 2)\ln(xy)$. On your printout write both coordinates of your critical points next to the output.

11. (3 points) Find all critical points for $f(x, y) = x^3 + y^3 - 6xy$. On your printout write both coordinates of your critical points next to the output.

12. (3 points) Use Lagrange multipliers to find the maximum and minimum values of $f(x, y) = x^2 y$ subject to the constraint $x + y^2 = 16$.