

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.

Note: The entire project totals 26 points but is graded out of 25 so there's an extra-credit point built in.

1. Clear Matlab completely with `clear all`. [1 pt]
2. Plot the function $f(x, y) = \sqrt{x^2 + y^2}$ with the view at (10, 10, 10). [2 pts]
3. Plot the function $f(x, y) = \sqrt{9 - x^2 - y^2}$ with the view at (10, 10, 10). [2 pts]
4. Plot the surface $y = 4 - x^2$ with the view at (10, 10, 10). [2 pts]
5. Find $\frac{\partial}{\partial x} [x \sin(x^2 y)]$ [2 pts]
6. Find $\frac{\partial^2}{\partial x \partial y} \left[\frac{x^2 - y}{x + y} \right]$ [2 pts]
7. Find ∇f for $f(x, y) = x \ln(xy^2) + xy$. [2 pts]
8. Find $\nabla f(-1, 0)$ for $f(x, y) = 5x^3 y^2 - \frac{y}{x}$. [2 pts]
9. Find the directional derivative of $g(x, y) = x^2 + y^3$ at $(2, -2)$ in the direction of $\bar{a} = 2\hat{i} - 3\hat{j}$. [2 pts]
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. [3 pts]
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. [3 pts]
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. [3 pts]