

# Modern Computing for Mathematicians (Math 587)

## Written Assignment No. 4

due April 7, 2009

### 1 Directions

Use GELLMU to write solutions for the following Calculus III exercises.

Re-state each exercise before presenting its solution. Write each solution carefully as if it were to be included as an example in a calculus textbook.

Submit in writing:

- A verbatim listing of your generalized L<sup>A</sup>T<sub>E</sub>X source.
- A printout of the PDF output.
- A verbatim listing of the <math> element in the XHTML + MATHML output file that has the greatest length as a string.
- The URL in your website at [www.albany.edu](http://www.albany.edu) where your XHTML + MATHML output may be found.

Note that this assignment sheet originated with the GELLMU source `amcm090407.g1m`.

### 2 Exercises

1. Find the equation of the plane in  $\mathbf{R}^3$  passing through the point  $(1, -2, 2)$  that is parallel to the plane given by the equation

$$2x - 3y + z = 0 \quad .$$

2. When

$$g(x, y, z) = xz + ye^x$$

find the second order partial derivatives:

$$(a) \frac{\partial^2 g}{\partial x^2} \quad (b) \frac{\partial^2 g}{\partial z \partial x} \quad (c) \frac{\partial^2 g}{\partial y^2}$$

3. Find the equation of the plane in  $\mathbf{R}^3$  that is tangent at the point  $(6, -3, 1)$  to the ellipsoid given by the equation

$$\frac{x^2}{4} + \frac{y^2}{9} + z^2 = 11 \quad .$$