

## COMPUTER PROJECT #2

**Due date:** Tuesday, June 21, in class.

**General guidelines.** You are supposed to work on your project alone. The purpose of the project is for you to acquire proficiency with “Maple” commands, online help system, and other features of the system.

**Legal matters.** You are responsible for making yourself aware of and understanding the policies and procedures in the Undergraduate Catalog (pp. 271–272) that pertain to Academic Integrity. These policies include cheating, fabrication, falsification and forgery, multiple submission, plagiarism, complicity and computer misuse. If there is reason to believe you have been involved in academic dishonesty, you will be referred to the Office of Student Conduct. You will be given the opportunity to review the charge(s). If you believe you are not responsible, you will have the opportunity for a hearing. You should consult with me if you are uncertain about an issue of academic honesty prior to the submission of an assignment or test.

**Problems.**

1. Find  $\lim_{(x,y) \rightarrow (0,0)} (x^2 + y^2)^{x^2 y^2}$ . [Hint: use the graph.]

2. Determine the non-zero value of  $c$  so that the function  $u(x, t) = c(e^{x-4t} + e^{4t-x})^{-2}$  satisfies the equation

$$\frac{\partial u}{\partial t} + u \frac{\partial u}{\partial x} + \frac{\partial^3 u}{\partial x^3} = 0.$$

[Your answer should look like  $c = 3$ . Unfortunately,  $c = 3$  is not the correct answer to the question.]

3. Find the total derivative of  $h(x, y, z) = (x^2 + y^2 - z^2, \sin(xyz) + e^{xz})$ .

4. Plot together the graph of  $f(x, y) = x^3 - x^2 - y^3 + y^2$  and its tangent plane at  $(1, 1)$ .

5. Approximate  $f(x, y) = y^2/x^3$  by a polynomial of degree 6 in  $x - 1$  and  $y + 1$ . [For example,  $3(x - 1)^4 - 5(x - 1)^2(y + 1)^4 + 7$  is a polynomial of degree 6 in  $x - 1$  and  $y + 1$ . Unfortunately, it is not the correct answer to the question.]