Math 245 - Multivariate Calculus - Project Guidelines

Overview: A *project* in Math 245 is a hands-on activity that provide students with an opportunity to either

- use the professional computational software program *Mathematica* to explore computational and graphical concepts introduced in class in greater detail and

- solve complex analytical problems in multivariable analysis that are best handled in a group problem-solving environment.

Project Report Requirements: The final report must meet certain requirements in order for it to be graded and receive *any* credit. The criteria are listed below. **Make sure** that the report you turn in follows all of the below rules!

1. The final report must be typed. Hand-written reports will not be accepted. Some caveats:

    - If every member of your group has taken (or are currently enrolled in) Math/CS 299, you are required to write your lab report in LaTeX. I can provide your group with a "starter file" to get you started.
    - If you have not taken and are not in Math/CS 299, you may use any typesetting software. One option is MS Word. Another is to use the editing options within Mathematica itself. If you choose Mathematica, then be sure to not just type "comments" (i.e., have your answers contained within the "(*" and "*)" symbols). Instead, use the word-processing functions of the software package that allows you to choose fonts, etc.
    - Contact me if you need help or have questions.

2. The final report should use an 11pt, proportionally spaced font with 1.5 line spacing.

3. The final report must be submitted by the due date in accordance with the guidelines below.

4. The final report must not be simply a list of numbered answers responding to questions posed in the laboratory description. You are expected to answer the questions using complete sentences, paragraphs, etc.

5. All figures in your lab report must include a label and caption. You should refer to the figure in the body of your lab report (e.g. "As you can see in Figure 10, the graph of the surface $z = f(x, y)$ features a singularity at $(0, 0)$, displaying no limiting behavior as $(x, y) \to (0, 0)$.").

6. Your writeup should be well organized with section titles.

7. All equations should be numbered so that they can be referenced in the text.

8. A good rule of thumb is that Dr. Mason, or anyone else with the appropriate background, should be able to read and understand your project report without having a copy of the questions handy.

9. Each lab must include a title, introduction, body, and conclusion.

10. All references must be cited.

11. All pages must be numbered.

Project Report Grading: The following general criteria will be used to formulate a final grade for the report:

1. Correct, clear, and logical mathematical results.

2. Use of proper English. This includes complete sentences, proper spelling, punctuation, paragraph structure and readability (i.e., are you making sense?).

3. Clear explanations. It is very important that your answers to various questions within the laboratory are clear, logical, complete, and easy to understand. Answers that are provided with no supporting text/explanation will be considered non-answers.

4. The use of clear, labeled diagrams/graphs/charts to illustrate your explanations and solutions. It is also important that said figures are described with clarity in your final document. Figures that appear with no context or narrative to support them will result in the loss of points.

Grading Rubric: The below table describes how points are allocated out of a total of 100 points per project:

Project Report Component	Points
Grammar (includes usage, spelling, punctuation, and sentence construction)	10
Clarity of Explanations (clear exposition, minimal use of pronouns, correct syntax, proper use of mathematical terms, etc.)	20
Appropriate Figures, Diagrams, Tables, and Graphs (clear and proper labels, axes, captions, references, etc.)	15
Correct Mathematics (correct calculations, results, etc.)	25
Completeness (includes introduction, conclusion, body, title, references, etc.)	20
Mathematical Format (proper use of equation numbers, symbols, etc.)	10
Total	100

Project Report Submission: All final submissions must be submitted electronically via the class Moodle site by the posted due date/time. You should submit TWO files: A PDF file that contains your written narrative/explanation as well as a *Mathematica* file that contains all of your computations so that Dr. Mason can run your notebook and re-create your results.

Files should be named as follows: If your last names of the members of your lab group are Jackson, Patel, and Ortiz, then your files should have the following titles:

JacksonPatelOrtiz_Project1.nb

and

JacksonPatelOrtiz_Project1.pdf

Project Advice: Here is some friendly advice:

- Don't wait until a couple days before the project is due to get started. This is not a "do one all-nighter and you are done" kind of project. Writing technical content well takes practice.

- Every member of your group must read the project prior to submission. The project should be written with a single "voice".

- AI or outside source (e.g. Chegg) use is forbidden. This includes *Grammerly*, any version of GPT/, etc.

  – One way I ensure this is achieved is to conduct a verbal question and answer session with your group so that I can be sure your everyone fully understands what they have submitted as their work.

  – If it is clear that external help from AI (or any other source like Chegg) was received, **every member of the group will receive a score of ZERO for the project.**