MATH 231-01: Homework Assignment 6

20 October 2025

Due: 27 October 2025 by 10:00pm Eastern time, submitted on Moodle as a single PDF.

Instructions: Write your solutions on the following pages. If you need more space, you may add pages, but make sure they are in order and label the problem number(s) clearly. You should attempt each problem on scrap paper first, before writing your solution here. Excessively messy or illegible work will not be graded. You must show your work/reasoning to receive credit. You do not need to include every minute detail; however the process by which you reached your answer should be evident. You may work with other students, but please write your solutions in your own words.

Name:

Score:

1. Find the local maxima, local minima, and saddle points of the function $f(x, y) = 2x^2 - 4xy + y^4 + 2$.

2. Find the local maxima, local minima, and saddle points of the function $f(x, y) = x^2 + y^2 + \frac{2}{xy}$.

3. Find the local maxima, local minima, and saddle points of the function $f(x, y) = 2xy^2 - x^2y + 4xy$.

4. Complete Problem 12 in Section 12.6 of the textbook (p. 975).

5. Consider the iterated integral

$$\int_1^4 \int_0^{1/y} \frac{x}{y} dx dy.$$

(a) Sketch the region determined by the bounds of the integral.

(b) Evaluate the integral.

6. Consider the iterated integral

$$\int_0^4 \int_{\sqrt{x}}^2 \sin(y^3) dy dx.$$

(a) Sketch the region determined by the bounds of the integral.

(b) Evaluate the integral by reversing the order of integration.