MATH 104: HOMEWORK 5

DUE DATE: IN CLASS – MONDAY, APRIL 8, 2024

Fulbright University, Ho Chi Minh City, Vietnam

Problem 1. Consider the function $f(x, y) = x^4 y^2 - xy^3 - 8x + 8y + 13$.
    (1) Show that f has a critical point at $x = 1, y = 2$.
    (2) Compute the Hessian H.
    (3) Classify the critical point at $(1, 2)$.

Problem 2. Find and classify the two critical points of the function
$$f(u, v) = u^3 - v^3 + uv - 7.$$

Problem 3. Consider the function $f(x, y) = y^2 - 2y + x^2 - xy - 4x - 2$
    (1) Compute the first and second derivatives of f.
    (2) Determine the global maximum and minimum of f over the domain in the plane where $x \geqslant 0$.

Problem 4 (From the worksheet). This is called the Mendelsohn game. Each player chooses 1,2, or 3 simultaneously. If they get the same number, no one gets anything. If A is higher than B by 1, A loses 1 point. If A is higher than B by 2, A wins 2 points.
    (1) Write down the payoff matrix for A.
    (2) What is the Nash equilibrium?