

Math 2551 A1-3 Midterm 2 (for practice)

Section:

Name:

Student ID:

(1) Find the values of $\partial z/\partial x$ and $\partial z/\partial y$ at the given point.

$$\sin(x + y) + \sin(y + z) + \sin(x + z) = 0, \quad (\pi, \pi, \pi).$$

(2) Find parametric equations for the line tangent to the curve of intersection of the surfaces $x^3 + 3x^2y^2 + y^3 + 4xy - z^2 = 0$ and $x^2 + y^2 + z^2 = 11$ at the point $(1, 1, 3)$.

(3) A flat circular plate has the shape of the region $x^2 + y^2 \leq 1$. The plate, including the boundary where $x^2 + y^2 = 1$, is heated so that the temperature at the point (x, y) is

$$T(x, y) = x^2 + 2y^2 - x.$$

Find the temperatures at the hottest and coldest points on the plate.

(4) Find the dimensions of the closed rectangular box with maximum volume that can be inscribed in the unit sphere.