

Math275-002

Sixth Written Homework

Due at class time, Monday, 11 October

- (1) Find the maximum and minimum values of

$$f(x, y) = 2 + x^2 + y^2$$

on the closed and bounded set

$$S = \left\{ (x, y) : x^2 + \frac{1}{4}y^2 \leq 1 \right\}$$

- (2) Find the minimum value of $f(x, y) = x^2 + y^2$ subject to the constraint $g(x, y) = xy - 3 = 0$
(3) Find the minimum distance between the origin and the surface $x^2y - z^2 + 9 = 0$
(4) Let $R = \{(x, y) : 1 \leq x \leq 4, 0 \leq y \leq 2\}$. Evaluate

$$\iint_R f(x, y) dA$$

where

$$f(x, y) = \begin{cases} 2 & \text{if } 1 \leq x < 3 \text{ and } 0 \leq y \leq 2 \\ 3 & \text{if } 3 \leq x \leq 4 \text{ and } 0 \leq y \leq 2 \end{cases}$$

- (5) Let S be the region bounded by the graphs of $y = x^2$ and $y = 1$. Evaluate

$$\iint_S xy dA$$