

Name: \_\_\_\_\_

Roll Number: \_\_\_\_\_

Section: \_\_\_\_\_

**Problem 1.** Let  $f : \mathbb{R}^3 \rightarrow \mathbb{R}$ , define  $f(x, y, z) = xy^2 + 4xyz + z^2 = 0$ . Find the directional derivative of  $f$  at the point  $(1, 2, 3)$  in the direction of  $(3, 4, -5)$ .

**Problem 2.** Evaluate the following integral by changing the order of integration.

$$\int_0^1 \int_y^1 \cos(x^2) \, dx \, dy$$

(You can start answering from here)