

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

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

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

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

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

$$\int_0^1 \int_y^1 \frac{\sin(x)}{x} dx dy$$

(You can start answering from here)