Name (Printed):

Pledge and Sign:

Upload solutions to Grade Scope by the due date. Assign solution pages to corresponding problems. You need to pledge and sign on the cover page of your solutions. You may use this page as the cover page.

Legibility, organization of the solution, and clearly stated reasoning where appropriate are all important. Points will be deducted for sloppy work or insufficient explanations.

1. In which of the following cases is $\mathbf{x} : \mathbb{R}^2 \to \mathbb{R}^3$ is a patch? [You need to check for regularity and 1-1-ness.]

   (a) [7 pts.] $\mathbf{x}(u, v) = (u^2, u^3, v)$.

   (b) [8 pts.] $\mathbf{x}(u, v) = (u, u^2, v + v^3)$

2. (a) [7 pts.] Prove that $M : (x^2 + y^2)^2 + 3z^2 = 1$ is a surface.

   (b) [8 pts.] For what values of c is $M : z(z - 2) + xy = c$ a surface?