Instructions. Show all work, with clear logical steps. No work or hard-to-follow work will lose points.

Problem 1. (4 points) Find the domain of the following function.

$$f(x,y) = \sqrt{81 - x^2} + \sqrt{y^2 - 1}$$

Solution. For the first square root, we need that $81 - x^2 \geq 0$, and for the second we need $y^2 - 1 \geq 0$. The first inequality gives $x^2 \leq 81$, or $|x| \leq 9$ and the second gives $|y| \geq 1$. □

Problem 2. (4 points) Compute f_x and f_y for the following function.

$$f(x,y) = e^{3xy^2} + 6y$$

Solution.

$$f_x = 3y^2 e^{3xy^2}$$
$$f_y = 6xye^{3xy^2} + 6$$ □

Problem 3. (2 points) Write whatever you want here for 2 points. Leave it blank if you prefer to lose 2 points.