

Name: _____

Score: _____

Directions. Show your work and write complete solutions or you may not receive credit. If you need more room, use the backs of the pages and indicate to the reader that you have done so.

1. (6 points) Let $f(x, y, z) = x \cos(yz)$ Find $\frac{\partial f}{\partial x}$, $\frac{\partial^2 f}{\partial z \partial x}$, and $\frac{\partial^3 f}{\partial y \partial z \partial x}$.

2. (4 points) Find the equation of the plane tangent to the surface $z = 3x^2 - 6xy + 2y^3$ at the point where $x = 1$ and $y = 2$. Your answer MUST be in the form $z = ax + by + c$ or $ax + by + cz + d = 0$.

3. (10 points) Find all the critical points of the function $f(x, y) = 3x^2 - 6xy + 2y^3$, and use the second derivatives test to determine if each critical point is a local maximum, local minimum, or saddle point.