Name: **Perm number:**

Midterm – in-class part

Time: 75 minutes

(1) Find an equation of the tangent plane to the surface $z = y \ln x$ at the point $(1, 4, 0)$.

(2) Find approximate values of $x(0.02)$ and $y(0.05)$, if $x(0) = 1$, $y(0) = 2$, $x' = xy - \frac{1}{2}x^2 - \frac{1}{2}y^2 + \frac{1}{2}$, and $y' = x^2 + y^2 - 5$.

(3) Use the Chain Rule to find $\frac{\partial R}{\partial x}$, if $R = \ln(u^2 + v^2 + w^2$, $u = x + 2y$, $v = 2x - y$, $w = 2xy$, and $x = y = 1$

(4) Find the volume of the largest rectangular box in the first octant with three faces in the coordinate planes and one vertex in the plane $x + 2y + 3z = 6$.